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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

Marketing of Bananas.

FOLLOWING upon his recent visit to Sydney and Melbourne, in the course of which, in conjunction with the Under Secretary (Mr. E. Graham), he had taken the opportunity of personally investigating the supply of bananas to the Southern markets, both in respect to the quality of the fruit and the conditions under which sales are effected, the Minister for Agriculture (Mr. W. Forgan Smith, M.L.A.) has issued a full statement as to the exact position in connection with these matters.

Mr. Forgan Smith said that it was found that a high percentage of bananas of satisfactory quality was now being supplied to the Southern markets. However, personal investigation had disclosed defects in the grading of the fruit, and there was ample evidence to show that individual growers frequently mark their cases in a manner wrongly describing the contents. In fact, in some cases brought under his notice the description was no indication of the contents at all. This irregularity in grading has been responsible for a good deal of the adverse comment to which the Queensland banana industry has been subjected. The inclusion of bananas of various grades in the same case has also had a detrimental influence. Instances of growers supplying three grades of bananas in one case were not uncommon, and examples also occurred of growers marking their fruit as being of "extra special quality" when inspectors at the growers' railing station had found it necessary to insist on altering this classification to that of "plain." Happenings like this, he added, indicated the necessity for the imposition of grade standards, and for a closer observance of the correct classification of the fruit, and justified the Department in the action it had taken to attain this very desirable objective. Uniformity in the method of packing the fruit by the growers would be of advantage. The presence of "squirter" in bananas was not detected, but the fruit, in a number of cases, had developed what is known as "wet end." This defect is of considerable concern to those engaged in

the ripening of bananas, because in practice it is found that the darkening and decay of the fruit expand considerably whilst in the ripening chambers. A large number of merchants are engaged in the ripening of bananas, but only in a few instances did the ripening chambers appear to meet the requirements, and it cannot be said that the ripening of fruit is carried out generally on scientific or systematic lines. In this connection Dr. Young, of the Council of Scientific and Industrial Research, is busily engaged in carrying out investigations relative to banana transport and the ripening of the fruit; and in furtherance of this object special chambers have been erected at one of the University buildings in Melbourne, and activities designed for similar purposes are being carried out by Dr. Baxter at the Queensland University.

Banana Grade Standards.

CONTINUING, the Minister said that the grade standards as prescribed recently by the Queensland Department were fully discussed with the responsible officers in the Southern Departments of Agriculture, and New South Wales has at present under consideration the matter of prescribing standards for bananas, and it is probable that that State, as well as Victoria, will institute grade standards in conformity with those in operation in Queensland. In addition to inspecting a considerable quantity of bananas produced in Queensland, opportunity offered to see bananas that were grown in either New South Wales, Fiji, or Norfolk Island, and from the latter source some good specimens of the Gros Michel variety were observed, but, generally speaking, the quality of the bananas supplied from Queensland was equal to that obtained from other parts. Unfortunately, it is the practice of some fruitsellers to acquire good quality fruit from Queensland and dispose of it as Fijian.

The Minister expressed as his considered opinion the view that the outstanding influences militating against the industry in the Southern markets were irregularities in the grading of the fruit and the marketing of under-sized bananas. Both these defects could be overcome by the strict observance of the standard requirements and the concerted action of the growers. The satisfactory quality of Fijian bananas was frequently mentioned by persons engaged in the fruit business, but in very few instances was the desire expressed to introduce bananas from Fiji, provided that the Queensland growers were prepared to supply the market with fruit of satisfactory quality and packed in cases upon which the grade of the fruit was correctly marked. There is no reason why the banana-growers of Queensland and New South Wales should not be able to hold the trade in bananas within Australia, but those markets must at all times be supplied with fruit of satisfactory quality and adequate in quantity to meet the market requirements.

The Queensland Sugar Industry.

THE criticism that has been levelled at portion of the last Annual Report of the Director of Sugar Experiment Stations appears to be very largely the result of slovenly reading, while an unfair article published recently in a Southern journal makes what looks like deliberate suppressions. In Dr. Kerr's report on some phases of the industry in Java, incorporated in the Director's report, to which exception has been taken, it was only intended to point out what had been achieved in Java by the adoption of scientific control methods, and it was not even inferred that such marked improvements could be effected in Queensland. Dr. Kerr says, "Although conditions in these islands are quite different to those obtaining in Queensland, still it is interesting to study the marked advances which have been effected during the last forty years by the application of the scientific method of control to the agriculture of cane growing"; while in speaking of intensive cultivation as practised in Java the report specifically states "it must, of course, be remembered that the costs of labour in Java are remarkably low," and "naturally many of the reforms which have been introduced could find but limited application in Queensland." Also, "by the system of land tenure operating in Java no ratoons are grown," and "the island is blessed with climatic conditions which are admirably suited for cane culture and that irrigation is practised almost generally."

It will thus be seen that the statements which have been objected to are qualified very materially, and the report should be read as a whole. It has also been stated that the returned travelling scholars should not have made reports until they had

gained some practical experience in the production of sugar in Queensland. As a matter of fact, the scholars did have extensive practical experience in the sugar districts of the State before going abroad, and one of them (Mr. Bennett) had also considerable mill experience in Queensland.

The Researcher and the Producer.

IN his last Annual Report the Public Service Commissioner, Mr. J. D. Story, I.S.O., comments very pithily on current rural topics, and has this to say on the researcher and the producer:—

"The new slogan 'Research; Research' seems to be drowning the old slogan 'Produce; Produce.' The voice of the scientist rings through the land announcing discoveries which scientific research has made, and some of these discoveries approach the magical; compared with them, even wireless becomes almost a thing of yesterday. Listening to the fascinating accounts of these discoveries, one becomes a little uneasy as to whether science is not racing ahead of the producer and far out-distancing him; as to whether the farmer is actually translating into practical action the discoveries and teachings of science. That thought raises the further thought as to whether these discoveries are being communicated promptly to the producer in that simple, concise, and illustrative way which makes them easily grasped and strikingly appealing; whether facilities exist to make it possible for the farmer to follow the teachings; if the facilities do not exist what action is being taken to create them. Unless there be effective linking of the discovery of the scientist with the practical application of the producer, much of the scientist's work must go for nought and the producer will continue to suffer when he need not. And, remember that statistics tell us that approximately 40 per cent. of our male breadwinners are engaged directly or indirectly in primary production. What, then, would be the best form of link between the scientist and the producer? The technical officers of the Department of Agriculture do what they can, but even they, perforce, often have difficulty in keeping abreast of new developments; opportunities for doing so are not always available; nevertheless, the trained instructor appears to be the corollary to the trained investigator. Confining ourselves particularly to Queensland, the time seems to have come when we should try to sift carefully the discoveries of science which are of highest value to primary production, and determine ways and means by which the lessons can be driven home with force and vigour. Something more is needed than mere sermonettes on a subject such as 'Farming on Scientific Lines.' If it be worth while to engage scientists to discover new facts and new processes, it is surely worth while to develop schemes by which proved methods may be put into practice. But these things should not be left entirely to the State. Commodity Boards and kindred bodies have their obligations; they have their part to play and they should play it. In my limited sphere I shall help as much as I can. As a layman I have approached this subject with some diffidence; but even a layman sometimes gets a point of view which escapes the expert."

Citriculture.

THE season for planting citrus trees will soon be favourable, and the attention of planters is particularly directed to the selection of varieties. In oranges, Sabina or Siletta and Joppa take precedence for Southern markets. These are only surpassed by navels which, unfortunately in many parts of the State, are not sufficiently productive to warrant their inclusion. A late variety, Valencia, takes precedence. Among mandarins, Glen Retreat is preferable in districts which are favourable, followed by Emperor, Scarlet, and for the Northern late crop, King of Siam. The difficulty of bud selection from trees of proved merit has been in a measure overcome by nurserymen procuring their supplies from approved trees. Though the additional cost is not high, it warrants a slight advance on the cost of trees. Growers would be well advised to insist on nurserymen supplying a guarantee that trees have been worked with the buds approved by the Department. The trees make three distinct growths in a year, and whilst dormant between any of these periods they may be transplanted with safety, but error on either side results in the root fibres perishing, and though the trees may survive they are very slow in making reasonable growth.

Bureau of Sugar Experiment Stations.

CROP PROSPECTS FOR 1929.

The Deputy Premier and Secretary for Agriculture and Stock, Mr. W. Forgan Smith, has received the following report from the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, upon the prospects of the sugar crop for 1929:—

"It is as yet too early to anticipate what the sugar yield this year is likely to be. Splendid rains have fallen in the districts above Townsville and at Mackay, so the crops should be good in those places, provided further wet season rain comes along. The southern areas are, however, needing rain urgently. A period of good soaking rains is required at Bundaberg, Childers, and in the cane districts to the south.

"The area under cane in Queensland is now approaching 300,000 acres, while the area from which cane was crushed in 1928 is given as 225,371 acres, being an increase over 1927 of some 21,623 acres. As there was an increase in the area crushed in 1927 of 14,436 acres over that given for 1926, it can be seen that the acreage under cane has materially increased in the past two years.

"The cane crop last year amounted approximately to 3,750,000 tons, which was easily a record, while the tons of cane required to make 1 ton of sugar are estimated to have been 7.25, which is the lowest to date."

ENTOMOLOGIST'S ADVICE TO CANEGROWERS.

FIRST PUBLICATION OF MONTHLY HINTS.

By EDMUND JARVIS.

This series of Entomological Notes was started five years ago (November, 1923), for the purpose of reminding our canegrowers of their responsibilities with regard to the control of those cane insects likely to be in evidence during each month of the year.

By early publication of full details regarding suitable methods of combating such insects, our object has been to save time, as far as possible, in order that growers may be in a position to tackle any pest upon the first indication of damage to the crop. Prompt action often goes far towards minimising injuries caused by such insects as "army-worms," or the grubs of some of our cane beetles.

Farmers are asked to take notice, however, that the activities of Meringa Experiment Station—in so far as visits of inspection from officers of the entomological staff, or the supplying of consignments of Tachinid fly parasites of the beetle borer be concerned—do not extend to localities below Townsville, or to those above Mossman.

Control of Cane Grubs.

First-stage larvæ of the "greyback" will be feeding until about the middle of this month, after which they will change their skin and enter upon the second instar, during which stage of growth they are able to effect serious damage to cane situated on light volcanic soils.

In order to distinguish between these moults of the larval condition of our "greyback" cockchafer, growers need only examine the head; which, unlike the body, does not alter in size during the periods occupied by each successive instar.

The width of head in first-stage grubs is $\frac{1}{8}$ inch; in the second instar, $\frac{1}{4}$ inch; and in the third instar, $\frac{3}{8}$ inch.

During this month infested cane fields should be fumigated with paradichlorobenzene or with carbon bisulphide, both of which fumigants have been proved to be valuable remedies when applied at the right time and to soil in a fit state for such fumigation. With regard to the latter fumigant—the toxic effects of which endure for only a day—expense of material and application will be entirely thrown away unless the soil has first been found to be in the right condition for allowing the poisonous fumes to penetrate freely in all directions.

With paradichlorobenzene the case is very different, seeing that after injection of the crystalline nodules, evaporation of the deadly gas continues through a period of from four to six weeks or longer. Wet weather simply retards or checks its rate of evaporation, which, however, is again resumed as soon as any excess of moisture has drained away.

Disturbing Grubs in the Soil.

Try to maintain a system of clean cultivation, particularly on land reserved for early planting, and which on that account is likely to receive less attention than areas devoted to the present season's crop. Advantage should be taken of the first opportunity afforded for moving the surface soil between rows of young shoots of plant or ratoon cane on land known to be liable to grub infestation. By disturbing the soil as close as can be effected without injury to the plants, first-stage grubs are often brought to the surface, while others are dislodged from their tunnels, becoming, in consequence, likely to fall an easy prey to ants or other soil-frequenting predaceous foes.

Controlling Grubs of Cane Beetles.

During the beginning of February larvæ of our "greyback" cockchafer occurring in the district of Cairns will be in the first and second stages of growth, and on light volcanic soils will have commenced to cause appreciable damage to cane roots.

In first-stage grubs the head is never more than one-eight of an inch wide, although the length of the body during this first instar may vary from one-third to half an inch in its doubled-up condition. Those in the second instar can at once be distinguished by the increased width of head, which then measures three-eighths of an inch.

Growers should take advantage of the first opportunity afforded for moving the surface soil between rows of young shoots of ratoon or plant cane thought likely to be grub-infested.

At times when the weather sets in dry for a week or so after a short spell of rainy days such movement of the surface soil becomes highly advantageous, since it not only stimulates growth of the stools and conserves the moisture, but by disturbing the soil as close against the cane rows as can be effected without injury to the plants, some of these small grubs are brought to the surface, while others, being dislodged from their tunnels and mixed with loose particles of earth, are likely to fall an easy prey to soil-frequenting ants or other predaceous enemies.

Fumigating Cane Grubs.

No time should now be lost before fumigating grub-infested land with paradichlor. or carbon bisulphide. In cases where soil injecters or special horse machinery cannot be easily procured, the crystalline nodules of the former fumigant (after being passed through ¼-mesh sieve) can be applied with the manure in any fertilising machine that will drill in this mixture to a depth of about 4 inches, and at a distance of about 5 inches from the cane rows; and after burying it will fill in the drill and slightly consolidate such disturbed soil by rolling same. Be careful to thoroughly mix the fumigant with the manure to ensure an even distribution; and to regulate the flow of the mixture in such manner as to sow about 120 lb. of paradichlor. per acre.

How to Fight Army Caterpillars and Plant-Eating Beetles.

Small beetles belonging to genus *Rhyparida* may prove injurious this month to young shoots or leaves of cane. The creamy-yellow grubs of this pest occur underground amongst the roots or in the centre of the shoots, giving rise to "dead-hearts"; while the beetles eat holes in the leaves of larger plants. Cutting out all dead shoots; collecting the beetles when very numerous; keeping headlands free from blady grass; and fumigating badly-infested soil with carbon bisulphide are all suitable remedial measures.

Outbreaks of army caterpillars, &c., can be combated by spraying the cane leaves in front of an advancing army with lead arsenate applied at the rate of 2 lb. in about 50 gallons of water. The mixture must be kept well stirred while being sprayed, as this poison has a tendency to settle to the bottom of the water unless kept agitated.

CANE PESTS AND DISEASES.

Mr. A. N. Burns, Assistant Entomologist, Central district, has submitted the following report for the month ended 12th December, 1928, to the Director of Bureau of Sugar Experiment Stations:—

Emergence of Greyback Beetles (*Lepidoderma albohirtum* Waterh.)

Following the beneficial rains of 25th and 26th November last, when just on 3 inches were recorded for the two days, the first, and probably general emergence of these beetles commenced. Since that time several more good falls of rain have occurred, keeping the soil in an ideal condition for the continued emergence of cane beetles. The numbers of beetles vary very considerably in different parts of the district. Plane Creek and Sarina report a moderate emergence only (from beetles received by collectors, and those noted on feeding trees) whilst around Racecourse and Farleigh areas large quantities of beetles are being collected. Feeding trees growing adjacent to the canefields along the Pioneer River are already almost denuded of their leaves. The same thing is to be seen in some of the feeding trees growing in the scrub lands adjoining canefields on the northern side of the railway line near Farleigh.

The writer has observed greybacks feeding on many trees that in the far northern areas were apparently free from attack. Native figs of various species (*Ficus* spp.) undoubtedly rank first in importance throughout this district as feeding trees, then Moreton Bay Ash (*Eucalyptus tesselaris*), Bloodwood (*E. corymbosa*), Blue Gum (*E. tereticornis*) and many different species of scrub trees are attacked to a more or less serious degree. As the beetle season advances, greater numbers of beetles may be collected from scrub trees, large numbers seeming to forsake the Eucalypts and other forest land trees.

Usually during the earlier portion of the flighting season male beetles predominate. From examples collected and dissected, however, at the present time the sexes appear to be fairly evenly proportioned. Hand collecting is being carried out in earnest throughout the district; this is to be greatly recommended, and in conjunction with the destruction of feeding trees growing in the immediate vicinities of canefields—particularly on the windward side—will tend to greatly minimise the subsequent grub infestation.

The writer would like to urge the advisability for the collection and payment of grubs as well as beetles. It is equally desirable, if not more so, to collect grubs; grubs collected in the months of February, March, and April will be prevented from doing further damage—they are active up till June and July—and that alone, particularly in the case of land that is being ploughed prior to planting, is invaluable. Besides the prevention of further injury, the subsequent emergence of beetles will be considerably lessened in areas where grubs are collected and destroyed.

Main Emergence of "Frenchi" Beetles (*Lepidiota frenchi* Blkb.)

The recent rains have been responsible for bringing out the main bulk of this species, and every evening about dusk, large numbers may be seen in flight, subsequently settling down in pairs on low bushes, fences, &c. Unlike the greybacks, these beetles do not resort to "feeding trees" during the daytime, therefore if they are collected, advantage must be taken of the comparatively brief time occupied during the evening flight.

There is also another flight in the early morning which occurs about half an hour or twenty minutes before sunrise; the evening flight, however, is more favourable for collecting as the beetles are settling on objects, whereas in the morning flight they leave the bushes and enter the soil, after flying about in apparent confusion for some minutes. They sometimes settle near the ground and remain quiescent for a minute or two before finally burrowing in.

Recently, during evening flights, the writer obtained up to as many as nine specimens trying to cluster together, clusters of six and more were very plentiful, and hundreds of mated pairs were hanging everywhere. The aerial existence of this species lasts approximately six weeks or more, and night after night the beetles leave the soil in flight. The eggs of this beetle are not deposited as is the case with the greyback, in a definitely formed cell; they are laid loosely amongst the soil, usually at a depth of from 3 to 6 in. Each egg is enclosed in a small pellet of earth, due to the earth clinging to the glutinous matter on the egg shell immediately after it is laid. Oviposition habits, &c., are at present being studied at the laboratory.

Christmas Beetles (*Anoplognathus boisduvali* Boisd.) in Flight.

These well-known "Golden Beetles" have been very plentiful since the rains of two weeks ago, and large numbers are being collected along with greybacks from feeding trees. In different localities, this species appears to favour different trees on which to feed. In the Cairns district the most favoured trees appear to be the Blue Gum (*Eucalyptus tereticornis*), Poplar Gum (*E. platyphylla*), Moreton Bay Ash (*E. tesselaris*), and Bloodwood (*E. corymbosa*), whilst on the Tully the writer obtained them in hundreds from young river myrtles (*Eugenia tierniana*). In the Mackay district, however, one of the most, if not the most favoured feeding tree is the common guava which fringes the roads, canelands, &c. Moderately large numbers may also be collected from the Blue Gums (*E. tereticornis*), Moreton Bay Ashes (*E. tesselaris*), and Bloodwoods (*E. corymbosa*). These beetles are voracious and rapid feeders. In many places the feeding bushes (guavas) already bear a "scorched" appearance due to the beetles having eaten all the leaf tissues away, leaving only the hard veins and midribs.

The writer bred examples of this beetle from grubs collected at the Experiment Station, also from several farms in the Mackay district. In each instance the grubs were found in canefields where the soil contained silt and wash from creeks, &c., and the injury caused to the cane was precisely similar to that occasioned by grubs of the "Dasygnathus Beetle" (*Dasygnathus australis-dejeani* Blkb.), i.e., the grubs had bored into the ends of the cane sets. In the writer's opinion, this and the Dasygnathus beetle rank almost equally in order of destructiveness in the Mackay district, and could be placed about third in order after the greyback and frenchi beetle grubs.

Mr. A. N. Burns, Assistant Entomologist, stationed at Mackay, has submitted the following report for the month ended 12th January, 1929, to the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby:—

Wireworm Damage at Walkerston.

Following a request made by a grower at Walkerston, an inspection was carried out on a farm where considerable injury had been done and loss sustained as a result of wireworm damage. In one field of Q. 813 plant cane, fully 2 acres had been eaten out, and the grower had to supply new sets, in some instances as often as three times, in the attacked portion. The "supplied" area of small young cane stood out in marked contrast to the surrounding cane, which was fully 3 ft. or more high.

The field was almost level, but had a slight fall towards one end; the attacked portion occupied the lowest-lying part, and was the only place where water lodged during rains. The soil was fairly heavy, dark brown-black, and contained much silt; it had a tendency to consolidate when wet. Another small block of about half an acre on the same farm was also badly affected, and the grower stated that he always found it almost impossible to secure a strike in that particular block owing to the ravages of wireworms. The ground here was black and of a very heavy nature, and the situation was low-lying with poor drainage. Cane just across a roadway on higher ground looked excellent.

The conditions prevailing in the affected portions of this farm were precisely similar to those noted some weeks ago on a farm at Te Kowai where much damage was done by wireworms, and in each instance the attack was confined to the lowest and most poorly-drained parts of the fields.

Most of the injury had been wrought prior to the inspection of the above farm, for in searching in sets for the wireworms, only examples in the pupal stage could be found. Comparison with this, and the species found at Te Kowai recently, showed both to belong to the same species. Specimens from Te Kowai were bred through at the laboratory, and results show that the wireworms (larvæ) are active during the dry season months. They feed naturally on rotten vegetation and humus in soil, but owing to the extreme dryness of the spring and early summer months last year, they resorted more than usual to the cane sets for food and moisture. This also probably accounts for the fact that in all cases of infestation noted, the wireworms were present in the wettest and mostly badly-drained parts of the canefields, evidently concentrating there on account of the moisture remaining in those parts the longest.

Greyback Beetles.

The emergence that took place following the rains late in November last was the main and only one that occurred in the Mackay district, these beetles remaining in flight throughout December, and a few stragglers up to the present time. The beetles that remain up to the present time are in a worn or wasted condition. As stated in last report, as the beetle season advances, the beetles forsake the feeding trees growing on the forest lands and resort more to the scrub trees only. Practically all beetles observed by the writer during the past fortnight were noted on trees occurring along creek banks, or on the edges of scrubs, &c.

There being one general emergence of beetles only, subsequent grub injury will probably show up throughout the district at about the same time, owing to the fact that most of the egg-laying of the beetles occurred about the second and third weeks of December. Experiments along this line were carried out at the laboratory by caging a large number of female grey-back beetles, and results showed that most of the eggs were laid between the 14th and 27th December. None were laid by the caged beetles after 31st December.

If the early summer rains are divided as sometimes happens—i.e., two good falls occurring with two or three weeks of fine weather in between—the beetle emergence is almost always broken up into two smaller emergences; consequently, as the bulk of the beetles' eggs are laid at two different times, the following grub emergences will show up also at different intervals.

The number of eggs deposited by one female beetle varies slightly; from the caged beetles the highest number obtained from one beetle was 36. The average number, however, laid by one female beetle may be safely estimated at from 26 to 28.

Greyback Grubs (*Lepidoderma albohirtum* Waterh).

Young first-stage grubs of this species are now present in canefields, and as yet are mostly to be found amongst grass roots and cane roots near the surface. They will continue thus for about a month or a little longer in the first stage, when they will moult into the second stage. Some five or six weeks are occupied in this stage, when they again moult and enter the third and most destructive stage. Fumigation, however, should be carried out before the grubs reach this latter stage, which is also before they have done any appreciable injury to the cane plants. During the first two stages the actual injury to cane roots is comparatively negligible when compared with that occasioned by them during the four or five months that they are active in the third stage.

Growers who are troubled with grubs on their farms should look at stools in areas they know to be usually subjected to attack, and if they observe the small grubs in any number at the cane roots, should fumigate with carbon bisulphide or paradichlorobenzene. Information in regard to this will be given on application to the Experiment Station.

Grub injury that is showing up in cane at the present time, or that was noticeable during the past two or three months, is undoubtedly due to grubs of the "frenchi" cane beetle (*Lepidiota frenchi* Blkb.). Fumigation against this species should be carried out about October or November, when the third-stage grubs now in their second year (this species has a two-year life cycle) come up from their resting cells with the advent of warmer weather. This species is sometimes found in successive years in the same "spots" in canefields, so growers noticing their cane wilting from grub attack from October to January or February should investigate by digging at the stools, where the large third-stage grubs will most probably be found. If desired, fumigation may be then carried out, or else the spot marked and the cane fumigated the following season, preferably before the grub injury shows up in the cane leaves.

The principal identifying characters of the greyback (*L. albohirtum* Waterh.) and frenchi (*L. frenchi* Blkb.) grubs is the difference in the arrangement of the hairs or bristles in their anal paths, i.e., the two rows of bristles on the ventral surface of the last body segment. In the greyback grub these bristles run in two parallel lines enclosing a narrow space between them, whilst in the frenchi grub they enclose a small elongate pear-shaped area, the large end of the pear shape being nearest the anal end of the body.

Eggs of Other Species of Beetles.

Other experiments have been carried out in connection with the ovipositing of other species of cane beetles and allied species, details of which will be given in future reports. The following, however, are the maximum numbers of eggs

obtained from one female of each of the following mentioned species of beetle:—Frenchi beetle (*L. frenchi* Blkb.), 26 eggs; Christmas beetle (*Anoplognathus boisduvali* Boisd.), 17 eggs; another species of Anoplognathus, 17 eggs; Anomala beetle (*Anomala australasiæ* Blkb.), 34 eggs; dusky cane beetle (*Dasygnathus australis* Boisd.), 15 eggs; golden beetle (*Anoplognathus mastersi* Macleay), 8 eggs; and the blue beetle (*Repsimus æneus* Fab.), 29 eggs.

In the case of each of these, the duration of the incubation of the eggs, &c., is being studied, and it is intended to study the complete life cycle of each of the above species, and in some cases their actual effect on cane plants.

Mr. R. W. Mungomery, the Southern Assistant Entomologist, has submitted the following report for the period November-December, 1928, *to the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby:—*

Notes on the Black Beetle (*Pentodon australis* Blkb.)

During the past two years, whilst studying the economy of several of the larger and more important Scarabæid grubs which attack sugar cane in Southern Queensland, our attention has frequently been centred on what is commonly termed the Black Beetle (*Pentodon australis* Blkb.). These beetles, like many other Dynastids, breed well under confined conditions, and during the time that they have been kept under observation at the laboratory, much data has been obtained in relation to their life history. In addition to this, notes have been made of the behaviour of both the larval and adult stages under field conditions, this evidence having been obtained when following ploughs, and by digging &c., and in this manner a considerable amount of information has been amassed. Although all the points connected with the behaviour of this beetle are by no means elucidated, it was thought desirable at this juncture to publish some of the more important details of its life history. By so doing, it is hoped that those who are at present embarrassed by the presence of this beetle on their cane lands, after having gained a more intelligent outlook on the pest, may be able to attack it in a more straightforward manner.

The beetle, which is of a uniformly shining black colour, is from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in length, female specimens usually being the larger of the two, and it is familiar to most canegrowers since its range of distribution includes practically all the sugar-growing districts of Queensland. Those who are unfamiliar with it are referred to a detailed description of the beetle, by Mr. E. Jarvis, on page 29 of Bulletin No. 3 "Notes on Insects Damaging Sugar-Cane in Queensland." In the South they are met with in the low-lying clay soils of the Pialba district, and on those farms adjacent to the Maroochy River, where for the most part they eat the eyes and tender shoots of germinating sets, thereby checking growth or producing blanks. In the drier, red volcanic soils of the Isis and Bundaberg districts the same beetle does not appear to give any great trouble. From the evidence of most districts suffering the ravages of this pest, it is apparent that a correlation exists between land growing paspalum grass and the incidence of black beetles on that land, for young cane suffers worst on land which had carried good crops of paspalum grass immediately previous to planting cane there.

Although the beetles are known to feed more or less throughout the year, feeding becomes more pronounced at the commencement of spring, and soon afterwards eggs are produced. The eggs are laid singly in the soil at depths of 6 to 8 inches, and our first records of egg deposition are towards the end of August. The incubation period of the egg is then about twenty-six days at a mean temperature of 63 deg. Fahr. As the spring draws on and the temperature increases, so does the rate of egg deposition increase until a maximum is reached in the months of October and November when the numbers again show a sharp decline. Conjointly with the approach of warmer weather the incubation period steadily lessens, this being nineteen days in October at a mean temperature of 69 deg. Fahr., and fourteen days in December at a mean temperature of 75 deg. Fahr. Soon after hatching from the eggs the young grubs commence to feed actively, ingesting large quantities of soil and rotting vegetation before becoming full grown, and it is from this rotting organic matter that they derive most of their nourishment. In addition to the beetles, these grubs are sometimes responsible for injury to cane, and their chief damage consists in eating into the ends of cane sets and hollowing them out. Thus it will be seen that they are not essentially root eaters like our notorious "furfuracea" and allied grubs.

The duration of the various stages is approximately as follows:—

First larvel instar	17 to 25 days
Second larval instar	14 to 16 days
Third larval instar (including prepupal period) ..	44 days
Pupal period	14 days

The entire cycle from the act of oviposition to the appearance of the adult beetle is approximately four months, this being a short life cycle when compared with our more common beetles which have a two-year period. Generally speaking, there is but one generation a year. Those beetles which become adults in the month of February and March, i.e., the result of the main October and November batch of eggs, do not usually commence reproducing until the following spring, but in the case of beetles emerging towards the latter end of December or in January, these may commence reproducing soon after feeding, so that in rare instances two generations may be produced in a year. The fact that in a few isolated cases third-stage grubs of *Pentodon australis* have been found in the field as late as June, supports the possibility of there being two generations under natural conditions, or else these grubs might represent a late production of eggs from the original spring beetles.

The longevity of these beetles is surprising. Unlike other beetles which, after emerging, mating, and extruding their egg supply, die soon afterwards, these beetles produce a few eggs at a time over a long period, and at present we have beetles that have been living in confinement for the past two years. They have produced eggs after each winter and are still active and functioning as though living under normal conditions. These are still being kept under observation to ascertain their maximum span of life in the adult stage.

Control measures are chiefly dependent on the time and method of cultivating the ground, and are such as would readily suggest themselves to anyone conversant with the life history of this pest. Paspalum grass land should not be broken up and hurriedly planted with cane. Instead, an interval of two months or more should elapse between ploughings in the spring and summer months so that the insect will be exposed in its larval stages to the numbers of insectivorous birds which usually follow ploughs. If possible, it is desirable that planting be carried out in autumn. If this is not possible on account of wet weather, which is so often a drawback to autumn planting, or should spring planting prove more suitable to that particular district, and it is decided to plant in spring, the land in this case should then have been prepared for planting some time previously and given a bare fallow, when the beetles will be forced to migrate elsewhere for their food supply. Beetles should also be collected and destroyed. The advice previously tendered by the writer in the "Queensland Agricultural Journal," Vol. XXVI., page 482, on the necessity for selecting large plants as an aid in combating this pest, could also be followed with advantage.

Anoplognathus spp. (2).

In company with the preceding species a few examples of slightly smaller though very similar beetles have been collected from guavas, and large numbers from the Blue Gum (*E. tereticornis*) and Moreton Bay Ash (*E. tesselaris*). At first, on account of their similarity, it was thought that they were only sexes of the Christmas Beetle (*A. boisduvali*), but on close examination and finding pairs mating, there was absolutely no doubt as to their being a distinct species.

Examples of both species were brought to the laboratory and caged alive, already large numbers of eggs have been deposited, so it is hoped that their life stages will be bred through this coming season.

A few isolated examples of another smaller Anoplognathid were collected at Peri and Farleigh from Moreton Bay Ash trees (*E. tesselaris*) only.

Anomala Beetles (*Anomala australasiae* Blkb.) in Flight.

This small dark blue-green beetle has been observed singly for some time, but since the more continued rains moderately large numbers have been noted in flight about dusk. The beetles are fond of congregating in groups on the tops of fence posts, stumps, &c. Unlike most of the other cane beetles which are leaf feeders, these insects prefer flowers, the principal of which are those of the common Lantana. Many specimens may be seen at dusk on these bushes, where they eat out the corolla of the flowers. A good many of the beetles have also been observed on Duranta and Frangipanni flowers.

The grubs of this beetle are found mostly in soil which is rich in humus or alluvial deposit, and, where they occur, are usually to be found in fairly large numbers. An allied species (*Anomala orientalis*), is responsible for considerable injury to cane in Java.

Miscellaneous Beetles Noted.

Specimens of the large and well-known Elephant Beetle (*Xylotrupes australicus* Thom.) have been observed flying to light during the past fortnight, and although searches have been made on several Poinciana trees—on which the beetles fed—no examples have so far been found on these trees. This beetle cannot be classed as a cane beetle as its large grubs are only to be found in compost heaps, filter press, heaps of wood shavings, sawdust, &c. incorporated with soil.

Whilst shaking Moreton Bay Ash trees (*E. tesselaris*) odd specimens of the dark blue-green beetle (*Repsimus æneus* Fabr.) and the bright green beetle (*Calloodes rayneri* Macleay) have been collected. A specimen of the latter species was obtained from a guava tree where it was taken in company with Christmas beetles (*A. boisduvali* Boisd.). Isolated specimens of the small true golden beetle (*Anoplognathus mastersi* Macleay) have also been captured whilst flying to light.

Mr. R. W. Mungomery, Southern Assistant Entomologist, has submitted the following report for the period December, 1928, to January, 1929, to the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby:—

Coloured Lights as an Attraction for Cane Beetles.

During the annual flight of beetles, which last year took place in December, further investigations were carried out in connection with the reaction displayed by the species *Pseudoholophylla furfuracea* Burm. (i.e., the species commonly met with in the Isis and Woongarra districts) when subjected to the influence of coloured lights. It had been demonstrated some time previously that the trapping of beetles of this species from year to year was not attended by any great benefit in lessening the number of grubs present in these districts in succeeding years, in so much that practically only male beetles were caught, whilst females escaped to reproduce their kind. In selecting coloured lights as a probable means of control, the writer was not sanguine of success on account of the poor results obtained from the past use of the ordinary yellow kerosene light, but it was deemed advisable to determine the degree of response exhibited by this species before abandoning this line of control. The lights used were red, dark blue, pale blue, and green, these being the various colours that were available. The traps were so spaced in the field that the rays from one light did not interfere with the rays from another, and the results of the collections made from the tubs over which each light was suspended are summarised below:—

Colour of Light.	Male Beetles.	Female Beetles.
20th December, 1928.		
Red	176	2
Dark Blue	123	0
Green	307	1
Pale Blue	168	6*
21st December, 1928.		
Red	37	0
Dark Blue	61	0
Green	205	0
Pale Blue	56	0

* The number of female beetles caught at this trap shows a somewhat higher proportion than in the collections made at the other traps. This might be explained by the fact that there was an attendant at this trap, and it is probable that some beetles may have been picked up on the ground surrounding the trap and placed in the container.

The results of this experiment went to prove that no appreciable benefits were to be derived from the use of coloured lights as a means of trapping beetles, and as it became more apparent on each succeeding night of the flight, this line of investigation was accordingly abandoned.

When Lights are Beneficial.

The use of light traps against insects which are active at night has frequently been the subject of investigation by entomologists, and several experiments have been conducted to prove the usefulness or uselessness of this form of control. Many years ago Slingerland made extensive experiments in America on this subject, and the following is the result of his findings:—

> "From 20th May to 1st October nearly 13,000 insects were caught. Seventy-seven per cent. were neutral, 10.4 per cent. beneficial, and 12.6 per cent. often pests; of the pests 79 to 93 per cent. were males; of certain beneficial forms 80 per cent. were females; and as many friends as foes were caught."

Although trap lanterns can be used with undoubted advantage against some insects, the writer is of the opinion that more benefit is to be derived from lights in locating beetles and collecting them from the objects on which they have settled, than by attempting to attract them to the light itself. In this connection the cane beetle (*Lepidiota frenchi* Blkb.), whose grubs at times do extensive injury to cane on some of the forest lands of the Bundaberg district, lends itself admirably to being collected by means of a lantern or torch. Soon after dusk these beetles emerge and mating pairs are then seen hanging from the cane leaves, fence posts, or shrubs, &c., close to the fields from which they have emerged. Some hours after mating they fly back to the fields to deposit their eggs, and thus the immense advantage to be gained by collecting these beetles is apparent, especially as the collector is assured of a 50-50 ratio in regard to the two sexes. If the female beetles are destroyed before their eggs are laid, this means approximately thirty potential grubs destroyed for each female, and if the collection of this species were systematically carried out, grub infestation in the year following would be materially lessened.

This method is hardly applicable to "furfuracea" beetles, for mating pairs are usually found on the ground and are very inconspicuous against the red soils where their grubs are found. The collector has mainly to rely on his sense of hearing and is attracted to these pairs by the continual buzz which the other beetles surrounding them make. At best, less than one hundred females can be taken on the first night of the emergence by experienced collectors in heavily-infested areas, and this represents a very small proportion of the females which must emerge from that locality. On succeeding nights the numbers taken show a marked decrease.

CANE PEST COMBAT AND CONTROL.

Mr. E. Jarvis, Entomologist at Meringa, has submitted the following report dealing with recent activities of the Meringa Station in connection with control of the adult or beetle condition of Lepidoderma albohirtum Waterh. for the period December to January, 1928-29, *to the Director of the Bureau of Sugar Experiment Stations:—*

Additional Notes on Poisoning Greyback Cockchafers.

This branch of control work was first initiated by the writer in January, 1915, when cage experiments were carried out at the Gordonvale Laboratory to test the effect of arsenical solutions sprayed upon food-plants of this beetle. The result obtained (described fully in Bulletin No. 17, pp. 12 and 13) showed that specimens placed with leaves sprayed with lead arsenate 2 lb., molasses 1 lb., in 50 gallons of water, died about nine days after feeding.

Six years later (1921), when this phase of control was again taken up by the writer, the results from five sets of experiments (comprising 89 cages, each containing a beetle and some sprayed foliage) showed that Paris green 1 lb., lime 1½ lb., in 8 gallons of water, was fatal in from four to seven days (Bulletin No. 17, pp. 70-72).

During December, 1926, this work was continued in order to determine the effect of stronger lead arsenate sprays, and of dry dusting of the leaves with various arsenicals. Excellent results were obtained at this time from foliage sprayed with lead arsenate 2 lb. in 10 gallons of water; the beetles eating such poisoned leaves dying the following day.

Experiments with dust sprays, however, were rendered inconclusive owing to the beetles—both in the treated and control or check cages—having apparently finished feeding prior to their capture from the trees.

Investigations in this connection during the present season (1928-29) have been based largely on the foregoing results derived from laboratory trials; these having been deemed sufficiently encouraging to warrant further study under field conditions.

The apparatus used in this outside work consisted merely of light wood frames made of filleting, covered on the sides and top with mosquito netting, and enclosing a space of 80 cubic feet, which were placed over young trees of *Ficus pilosa*, 4 to 5 feet high, growing at the Experiment Station. The two poisons tried were calcium arsenate and lead arsenate, the former being made up in the proportion of—Sodium arsenite 8 oz., lime (unslaked) 6 lb., water 20 gallons; while the arsenate of lead in the latter spray was applied in the proportion of 8 lb. to 40 gallons of water.

Effect of Arsenate of Lead on Cane Beetles.

In this experiment the wooden bottom of the frame enclosing the fig tree stood upon flat sheets of galvanised iron, on which, close to the stem of the tree, tins of moist soil and other suitable harbour for the beetles during the daytime were placed. One hundred specimens of greyback beetle—which had probably not been on the wing more than about four days—were collected from feeding-trees on 26th November, and enclosed at once in the frame. The foliage of the trap-tree was sprayed with lead arsenate (2-8 formula) to which a little casein had been added to ensure even spreading; the pump used being of the Knapsack pneumatic form, throwing a fine misty spray. Mortality of the beetles commenced after the second night of feeding, continuing at intervals until 5th December, as shown by the following table:—

Mortality of Beetles Eating Leaves Sprayed with Lead Arsenate.

1928.	Beetles alive.	Beetles dead.	Escaped.
November 26	100		
,, 27	99	1 (female)	
,, 28	85	14 (6 males, 8 females)	
,, 29	64	13	8
,, 30	54	10	
December 1	48	6	
,, 3	9	35 (12 males, 23 females)	4
,, 5	0	9	
	0	88	11

As a result of the above experiment certain data of an interesting nature have been secured with regard to the economy and habits of the cockchafer in question. None of these hundred "greybacks" lived longer than ten days after capture; and, as portions of several of the leaves had been eaten, we may reasonably assume that about 75 per cent. of the beetles either nibbled the edges or devoured small pieces of the poisoned epidermis, as shown by damaged leaves on the tree. Fully 80 per cent. of the specimens harboured during the day in the moist soil provided, although many were usually found resting in a torpid conditions on the sides or corners of the frames, and a few upon the leaves of the fig-tree. A large percentage of the dead beetles was discovered buried in the soil, the remainder lying on the floor of the frame or under debris. The former had probably succumbed to the poison soon after digging at daybreak, while the latter had most likely died during the hours of darkness. In similar frames of netting which were placed over fig-trees on cultivated land, the soil was allowed to form the floor (16 square feet in size), and in such cases practically all the cockchafers passed the day underground, very few remaining on the netting or leaves after daybreak.

Another cage of similar size, which was put over a fig-tree sprayed on 17th November with arsenate of lead (2 lb. to 10 gallons of water) gave a mortality of two female beetles on the following day; proving that lead arsenate when applied at this strength is very deadly to our cockchafer beetle. Furthermore, it does not injure the leaves of such trap-trees or check growth of the budding foliage at ends of the shoots.

Effect of Calcium Arsenite on Cane Beetles.

On 16th November, a young tree of *Ficus pilosa*, about 4 feet 6 inches high, was sprayed with calcium arsenite, mixed in proportion of 8 oz. sodium arsenite, 6 lb. quicklime, in 20 gallons of water. This was enclosed in a netting-covered frame measuring 4 feet by 4 feet by 5 feet high, the lower edge of which was let into the soil to a depth of about 4 inches. Fifty-two newly emerged "greybacks" were then placed under the frame and covered over with moist soil. Unfortunately, conclusive data regarding mortality was not obtainable from the cages let into the soil in this manner, as despite precautions taken to consolidate the ground against the lower edges of such frames, more than half of the imprisoned beetles managed to escape by tunnelling under the lower ground plates. The poison, however, proved fatal after the fifth night, while fifteen beetles were found dead between the dates 21st to 24th November. These figures were probably higher, since the mortality occurring amongst the numerous beetles which had escaped during these four days but which had fed on the poisoned leaves could not be determined. We may gather from results obtained by the abovementioned field experiments that a row of small trap-trees planted about four chains apart on some suitable headland, and sprayed with lead arsenate as soon as possible after the emergence of "greybacks," should help to materially lessen the numbers of this pest occurring on cane land in the near vicinity.

Those in the habit of collecting these beetles for sale are aware that they show decided preference for certain feeding-trees, upon which they tend to congregate in considerable numbers each season. Many of those visiting trap-trees would probably taste the leaves before passing on, and such slight nibblings would prove fatal a few days later.

Seeing that twelve to fourteen days must elapse after emergence before the commencement of egg-laying, all the beetles visiting such poisoned foliage during a period of at least nine days would perish. In the event of migrating beetles settling in such trees, heavy mortality would be likely to occur; especially amongst assemblages which had travelled several miles without feeding.

As already suggested in previous reports (Bulletin No. 17, pp. 64 and 65), the best plants to use for trap-trees in the district of Cairns are the Moreton Bay Ash (*Eucalyptus tessalaris*), the Weeping Fig (*Ficus benjamani*), and *Ficus pilosa*. These can be grown with very little trouble from seed or from cuttings planted during the wet season. Such trees should be pruned occasionally, with view to encouraging a low and spreading growth of foliage which can be easily sprayed, or beetles collected from same without difficulty.

Photo.: Jean Easton.]

PLATE 29.

Arable and Pasture Lands on Coochin Coochin.

THE CONTROL OF MEAT ANTS.

By W. A. T. SUMMERVILLE, Entomological Branch.

Although under most conditions the common meat ant (*Iridomyrmex detectus*) can scarcely be considered in the light of a pest, it frequently happens that, when present in very large numbers or when nesting in certain places, they are far from welcome. In the worst cases they do assume pest proportions. It has, therefore, been considered advisable to carry out some trials with a view to determining the most efficient method of control for these insects.

Accordingly, experiments with this object in view have been carried out. As far as possible the work has been done with cheap substances, safe to handle and reasonably easy to procure.

The nests used in the trials were from medium to large in size. These terms are used according to the following standards:—Large nests have a mound of 25 to 35 cubic feet, medium-sized ones a mound 18 to 25 cubic feet, and small ones less than 18 cubic feet.

Of the materials used, by far the best results were obtained with carbon bisulphide, and this substance used as described below can be confidently recommended for the control of the abovementioned species of ant.

However, the results obtained with calcium cyanide are well worthy of note, particularly by such men as happen to have a power blower of some simple type.

In recording the results obtained, it has been considered advisable to include not only the favourable ones but also some unfavourable ones obtained with substances which might otherwise appeal to the farmer.

Summary of Results.

The results obtained with the following seven substances will therefore be given:—

1. Carbon bisulphide.
2. Calcium cyanide.
3. Hot tar.
4. Kerosene.
5. Paradichlorobenzene.
6. Grass and chippings.
7. Hot and cold water.

1. Carbon bisulphide.

From experiments performed with this liquid it was ascertained that used as follows carbon bisulphide is an efficient though not particularly cheap means of control:—

(*a*) For a medium-sized nest it is necessary to use a little less than half a pint of the compound. The amount for each other size can be calculated directly using the standards as laid down above.

(*b*) Pour a little into each of the main holes making sure that there is a fairly good distribution throughout the nest.

(*c*) Immediately cover the nests with sacks.

(*d*) Wait three or four minutes and then apply a light. The light must be attached to the end of a stick at least 3 or 4 feet long. The bags should be quickly removed and then the light applied in two or three places. The bisulphide is highly inflammable and no risks should be taken when applying the light.

Care must be taken not to explode the gas too soon. If the light be applied in less than the stated time it will be found that there is only a relatively quiet burning taking place, and no explosion causing the galleries to be shattered, occurs. The burning is therefore far less efficient than the exploding.

(*e*) The explosion is not completed for some minutes. It is therefore advisable to wait about five minutes and then replace the bags over the nest. By again covering the nests the fumes are retained for a longer time and many ants, not killed outright during the explosion or before it, will thus have less chance of recovering.

(*f*) To obtain the best results it is advised that the work be carried out in the late afternoon at which time there is the greatest number of ants present in the nests.

2. Calcium cyanide.

Two brands of calcium cyanide were used—Cyanogas "A" dust, and Cyanogas "B" dust. Experiments were carried out with amounts varying from 1 to 3½ oz. on different sized nests. The dust was injected by means of (*a*) hand blow gun; (*b*) dust gun.

From these experiments the following conclusions have been arrived at:—

(*a*) The Cyanogas, especially in the form of "A" dust is highly destructive to this species of ant.

(*b*) The best cheap available means of applying the dust are not at all efficient except for the smallest nests. The pressures which can be produced by these blowers are far too small to force the dust any distance into the large-sized nests.

(*c*) Owing to the facts outlined in (*b*) it was not possible to determine the quantity of dust necessary per nest, but results obtained indicate that it would be very small. Indeed, it would appear that if suitable means were available for injecting the dust the cost would be somewhere about one-fifth that of carbon bisulphide.

3. Hot tar.

Hot tar proved to be quite ineffective. It did not reach the queen or immature stages which are usually hidden well down in the nest. It merely blocked up the entrance holes and passages and the surviving adult workers simply set about making fresh openings into the galleries.

4. Kerosene.

Kerosene is equally ineffective for, although fatal to those ants with which it comes in contact in quantity, too much would be necessary to allow of its general use.

5. Paradichlorobenzene.

This substance was tried in fairly heavy dosages but there was no indication that it destroyed or even irritated the ants.

6. Grass Chippings.

It sometimes happens that it is desirable to cause the ants to move from a particular spot. In such cases there is generally no necessity to kill the insects and it will be found that grass or chippings spread fairly thickly over the mound irritates the ants to such an extent that they soon build a new nest elsewhere.

7. Hot and cold water.

Water, hot or cold, pored into the nests several times daily for a few days, was found to cause the ants to move their nest to a new place but did not kill the insects.

OVERFAT PIGS.

It seems that the common practice of fattening bacon pigs in a small pen, where they have an abundance of food, such as maize, milk, and roots, but very little exercise, is the chief cause of overfat pigs coming into the bacon factories.

On most farms where pigs are being topped up for the factory, they are penned in small places, about two months before they are prime weights and then fed very liberally; this, with a lack of exercise and green food, naturally tends to put the required weight on to the pig more in the nature of fat and soft flesh than as firm flesh and little fat.

Over-fatness it not the only trouble we find in pigs which are confined in small pens. In most cases, it is not convenient to have these pens cleaned out frequently and the result is a hotbed of filth for the pigs to live in. These conditions are conducive to disease and parasites in the pigs, and while in this condition the pigs will not make the required maximum growth.

Considering the conditions under which we are getting overfat pigs, it would seem that the best way out of the trouble is to graze the pigs either on grass or fodder crops, right from weaning age up to the time they are sent to the factories.

It will be agreed that pigs will run off all their condition and will not fatten properly while grazing in large yards or paddocks, but in practice some progressive farmers are topping off their pigs while on pasture, and these men are quite satisfied. Their pigs are certainly healthy and in good marketable condition when they reach the required weights.

As the Queensland farmer has to market his pigs at a comparatively early age, the animals are still growing fast while they are being topped for the market, and, therefore, need conditions and feed suitable for fast growth more than for fattening. Certainly the best conditions for growing pigs are plenty of exercise and sunlight, with ample feed of good variety and quality.

For those farmers who are dubious about fattening pigs on pasture, it would be advisable to try the scheme with a fair-sized mob of pigs, just to prove for themselves that it pays in every way to run pigs on pasture right from weaning up till the time they leave the farm for the bacon factory.—L. A. Downey, Instructor in Pig Raising.

RURAL ROUTES IN QUEENSLAND.

THE WORK OF THE MAIN ROADS COMMISSION.

In our last issue we reviewed briefly the work of the Main Roads Commission as set out in the Seventh Annual Report. Through the courtesy of the Commission, through its Secretary (Mr. J. E. England), we are now able to present the rest of the plates with which the report was illustrated and which indicate the value of this phase of the widely-embracing rural policy of the Queensland Government.

PLATE 30.—PORTION OF MAIN SOUTH COAST ROAD.
Quartzite gravel bitumen-surfaced 20ft. wide.

PLATE 31.—BRISBANE-IPSWICH ROAD EXPERIMENTAL SECTION.
Bitumen of various grades and varying quantities under test.

Plate 32.—Pine Shire. Brisbane-Gympie Road,
Showing stage construction, the final surface being penetration bituminous macadam.

Plate 33.—Noosa Shire. Cooran-Kin Kin Road,
Showing deviation over Range serving fruitgrowers and dairymen.

PLATE 34.—TIARO SHIRE.
Maintenance gravel on old Maryborough-Gympie Road.

PLATE 35.—AYR AND THURINGOWA SHIRES. HAUGHTON RIVER LOW-LEVEL BRIDGE.
Carrying sugar railway (2-ft. gauge) and road traffic.

Plate 36.—Cairns Shire. On the way from Gordonvale to Little Mulgrave River.
Deviation to improve grade and alignment of old road.

Plate 37.—Ayr Shire. Bridge over Bannister's Lagoon.
Reinforced concrete substructure, timber superstructure.

PLATE 38.—TINAROO SHIRE, NORTH QUEENSLAND.
YOUNGABURRA-LAKE BARRINE ROAD.

Plate 39.—Wangaratta Shire. Collinsville-Mount Coolon Road.

Low-level timber bridges and concrete causway over Bowen River, which have been severely tested by several floods. Maximum flood level is 60ft. above deck.

PLATE 40.—HERBERTON SHIRE. KABAN-LONGLANDS GAP ROAD,
Showing rubble metal section.

THE "WINSALL" TOMATO.

Mr. M. C. Wood, Toombul, writes:—The tomato known as "Winsall" was raised by Henderson and Company, New York, and was first released by them in 1924. The raisers claim it to be bigger and better than "Ponderosa," and the claim is well justified by the experience of the writer. This is by no means exceptional, as they may be grown to well over 2 lb. in weight without difficulty. The skin is of the same colour as that of "Ponderosa," but the flesh has less pulp, more "meat," and fewer seeds. But, like Ponderosa, it has two faults, i.e., bud dropping and occasionally deformed fruit; however, in spite of the former, very heavy crops are borne. The one illustrated was grown in my garden, not with a view to obtaining great size, but as a test with four other varieties—viz., "Matchless," "Ponderosa," "Walker's Recruit," and "Yates' Erliwinner"—to ascertain which variety the soil suited the best. The soil is a light sandy loam rather deficient in humus. It was heavily dressed with superphosphate and the potash was supplied in the form of wood ashes, both being thoroughly mixed with the soil before planting. Each plant was staked and grown to a single stem. During growth, but after the first fruits had set, the plants received two applications, at an interval of two weeks, of liquid nitrate of soda to keep the sap moving as the season became dry. No other fertiliser was used. Although the season was a particularly dry one, which no doubt accounted for the almost entire absence of the usual fungus troubles, the plants were kept well irrigated with the result that very little (blossom-end rot) developed. "Matchless" was affected slightly, but "Winsall" and "Ponderosa" were practically free.

A JOURNAL OF WIDE INTEREST.

A Ballarat (Victoria) subscriber to the Journal, renewing his subscription for 1929, *writes:—*

"You are to be congratulated both for the get-up and wide interest of your Journal. It deserves to be read, digested, and prized by all who claim to be lately and credibly informed."

THE AGRICULTURAL POSITION IN QUEENSLAND.

WEATHER AND CROPS

The Minister for Agriculture and Stock, Mr. W. Forgan Smith, has received from his Officers, the following summary of the position of the general agricultural crops in Southern and Central Queensland for the last quarter of 1928.

Weather.

Southern districts were not generally so fortunate in regard to rainfall as those in the Northern and Central portions of the State. Useful rains, however, were experienced, but the storms were more or less irregular and patchy in character. Reports from the closely settled areas of the Boonah district are to the effect that dry weather has seriously affected production, although a considerable area of land was prepared for the sowing of seasonable crops. It is expected that several thousand acres of maize will be planted after the heavy rain which fell on the 31st December. Crops for green fodder purposes will about equal the area planted last year. The Beaudesert district appears to be more fortunate in regard to thunderstorms, many of which were experienced during November and December, and as a result forage crops were extensively planted. Generally speaking, these and other crops are showing good growth and promise.

Wheat.

From the latest information made available by the Secretary of the State Wheat Pool, it is estimated that the 1928 harvest will approximate two and three-quarter million bushels of grain, the quality of which was fair to good. Crops sown on early and well-prepared land made the best growth and returned the heaviest yields. On the other hand, late sown areas suffered from a run of dry weather in August and September; the October rains wrought a wonderful improvement in all wheat crops, and in some instances the yields were high, a few fields returning in excess of 40 bushels per acre. Unfortunately, some of the late planted areas, particularly on the red soils in the neighbourhood of Clifton yielded very lightly. Notwithstanding this fact the average yield should be a little above normal.

Maize.

In most districts in Southern Queensland the sowing of early maize crops was considerably delayed owing to the dry spring. However, matters were more favourable this year than last in the Kingaroy district; here, a considerable increase was noted in the area planted with maize. This may have been influenced by the somewhat unsatisfactory conditions existing in the peanut industry.

Peanuts.

Approximately 6,000 acres will be planted with peanuts this year. Many fields cropped last year with peanuts have been planted with maize. Good progress is being made with the peanut storage and treatment plant at Kingaroy.

The Lockyer district was fortunate in experiencing good, useful rains during October and early November, and crops are now to be seen in all stages of growth. Haymaking is in full swing and the early maize crop is fairly promising and should yield at least a three-quarter crop. The early crop of pumpkins is generally light, but the later planted areas should give a more satisfactory return.

In the Harrisville district many of the early sown crops failed on account of the dry weather; rain which fell, however, during December entirely altered the position, and lucerne and other crops are now making good progress. Extensive plantings of summer fodder crops, chiefly White Panicum, Japanese Millet, and Sorghum have been made throughout the district. The area under maize is also fairly extensive; it being expected that about 8,000 acres will be cropped. Pumpkins have also been planted extensively, and heavy plantings of potatoes are anticipated for the winter crop.

Very favourable reports have been received from the Pittsworth district, where all classes of fodder crops intended for grazing-off purposes are doing well. Soudan Grass for this purpose has been largely sown. Both the early and late planted maize crops are in fairly satisfactory condition, and the harvesting of lucerne crops has latterly been general.

The Crow's Nest district does not appear to have participated in the early storms. The growth of pastures has been retarded and crops generally have suffered from lack of sufficient rain. Many fields have been lying fallow for some time awaiting sufficient moisture to ensure a satisfactory germination of seed. Generally

speaking of conditions in Southern Queensland, it is to be remarked that a good general rainfall is badly needed in order that pastures and crops may make sufficient headway during warm growing conditions.

Central and Mackay Districts.

Reports from the Central and Mackay districts indicate that heavy rainfall was experienced at Mackay, Sarina, and Carmilla, and the soil in many places has been over-saturated so much so that crop growth has been retarded. Additionally, it has not been possible to cope with weed growth owing to the sodden nature of the land. From St. Lawrence to Rockhampton the rainfall, although of a patchy nature, has been sufficient to provide abundance of feed. South of Rockhampton to Bundaberg fair rains have fallen; natural pastures are in fair condition, but further rains are required to ensure satisfactory crops of maize, &c.

The Dawson, Callide, Springsure, and Capella districts have all been favoured with useful rains, and the season, particularly in the Emerald-Springsure and Emerald-Clermont districts is exceptionally good. Crop prospects in the Central district are reasonably good for the next three months, and even if the rainfall happens to be of a scanty nature natural feed for dairy stock should be sufficiently plentiful. Crops intended for pig-raising purposes are generally in evidence throughout the Dawson and Callide districts and are making good progress.

So far as dairying is concerned, the condition of the pastures varies considerably through the dairying districts. As a result of storm rains good growth of pastures has resulted, while in other portions, both on the coastal and Downs, the pastures are scant, such areas not having benefited by rains.

The supply of water is generally adequate, but in some localities the dams are getting low.

The condition of stock generally is from fair to excellent; the great majority, however, are in good condition.

More attention is being given to herd testing generally, and it is pleasing to note that the field officers are taking a direct interest in this important branch of the industry. The Hert Testing Staff are at the present time fully occupied with their duties. Field officers report that the introduction of better class dairy bulls is receiving attention, and the Dairy Cattle Improvement Subsidy Scheme has been instrumental in interesting dairy farmers generally in the matter of breeding high class dairy animals.

At the present period the output of dairy products, on the average, is approximately normal. Should rain of a soaking nature fall over the dairying districts in the near future a rapid increase of dairy products will take place, resulting in an output above normal.

In the absence of rain and the high temperature prevailing, it appears that the output of dairy products will decrease as the green succulent pastures require further rainfall to ensure maturity.

The spring and early summer was generally dry through the dairying areas of the State, and early planted fodder crops were a failure. During the latter period of the year electric disturbances resulted in beneficial falls of rain over a good portion of the areas devoted to dairying throughout the State. There are, however, isolated areas on the coast and Darling Downs which have not as yet benefited by a serviceable rainfall. In these places pastures are scant and there is an absence of fodder crops. The falls of rain, the results of electrical disturbances, were of a heavy nature, but general rain is generally needed to ensure ample supplies of natural pasturage and fodder crops for the late summer and autumn period. Owing to an absence of spring and early summer rains the areas usually planted with fodder crops are below the average. The time of planting autumn and winter crops for fodder purposes is approaching and large areas will be seeded.

AN INSTRUCTIVE JOURNAL.

A subscriber at Samarai, Papua, renewing his subscription for a further two years, writes:—"I should like to express my admiration at the excellence of the articles in the Journal from an instructive standpoint, as well as for the continuous improvement in the Journal generally as time goes on."

PIG RAISING IN QUEENSLAND.

SOME ECONOMIC PHASES.

In this article Pig Raising is dealt with as one of the industries associated with Dairying and Mixed Farming, in which every farmer in Queensland is interested.

As with other branches of agriculture, the production of pigs is a business requiring specialised knowledge, though it may appear to the uninitiated there is nothing to be learned about feeding and handling pigs. The business is not one requiring a large capital nor an expensive plant, particularly where it is associated with dairying and general farming; the provision of abundant supplies of suitable foods, a liberal water supply, clean, comfortable accommodation, and necessary utensils are among the principal requirements. To the specialist who intends devoting the whole of his time to pig raising on commercial lines, the business runs along different lines to a combination of cows and pigs.

Not alone should careful consideration be given to the financial side of the proposition at the outset, but continuous attention is necessary to factors that determine the profit and loss in the carrying out of the activities. It is particularly these phases that this article seeks to elucidate.

ECONOMIC FACTORS.

The economic factors in pig raising are—

1. **The man, his methods and capital.**
2. **The farm and the climatic conditions.**
3. **The food supply and its relationship to seasonal rainfall.**
4. **The stock, their care and management.**
5. **The markets and their demands.**
6. **Pig prices and future prospects.**

Special Attractions of Pig Raising in Queensland.

Climatic conditions in Queensland, while variable in regard to rainfall, are conducive to the production of healthy stock under conditions favourable to early maturity. Dry-farming systems plus suitable varieties of grain have enabled the wheat farmer to largely overcome variable seasons, and on better methods and conservation of food and water the pig farmer must also largely depend.

Other factors worthy of note in the production of pigs are the comparatively small amount of capital required to engage in the business; the ease with which one may enter into or retire from the ranks of pig farmers; the quick and profitable turnover; and the comparative freedom from risk of calamity. If the pigs and piggeries are kept under hygienic conditions such as are favourable to health and the development of animals naturally suited to forced feeding and early maturity, there are not likely to occur any serious avoidable losses.

It is worthy of note also that pigs are particularly healthy in Queensland, and that climatic conditions are equable and specially suited to open-air systems of stock raising. In this regard Queensland compares more than favourably with any other country in the world.

Systems of Pig Raising in Queensland.

Pig raising in Queensland is usually carried on along the following lines:—

(1) In conjunction with dairy farming in which skim milk, whey, or (in fewer cases) buttermilk, form the major portion of the food used. The system combines the feeding of dairy products and farm-grown crops, and is invariably regarded as the safest and surest road to profit, in the keeping of pigs. More than 90 per cent. of the pork produced in Queensland could be classed as "dairy-fed pork," a food product in universal demand the world over at top price.

(2) Pigs in conjunction with mixed farming, combining the growing of grain (corn, barley, wheat, &c.), green crops and roots, &c. This system, while quite a practicable one, is mostly regarded as carrying more risk than where cows and pigs are combined. There is, however, no reason why the system should not be successful, but it necessitates the cultivation of crops, and in that sense is more dependent upon seasons of liberal rainfall. The system of utilising milch cows to consume grass and green crops in the production of milk, of which a proportion—minus the cream—is used for pig-feeding purposes, appears to be preferred throughout Australia.

(3) Pigs as a special line where fed on buttermilk, grain, greenstuff, &c. This system operates in conjunction with butter factories, and, in fewer instances, in conjunction with cheese factories where supplies of whey are available, and under expert management is a profitable undertaking. The system requires a much wider knowledge of the business and closer detailed attention. It is not, however, likely to expand much as the principal butter factories (with a few exceptions) have now installed machinery to convert the liquid buttermilk into buttermilk powder, a concentrated product in increasing demand and yielding a higher return than the fluid product.

(4) Pigs on farms where they are fed on the waste food from hotels, cafés, manufacturing establishments, produce markets, &c. Though this system of pig feeding is not at present as extensively carried out in Queensland as in the more populous Southern States, there are numerous suburban and metropolitan pig farms. The business under expert control is a highly profitable one, but as in the case of (3) requires a larger capital and a wider knowledge of the methods of feeding and handling. The business is also one necessitating long hours and considerable labour in collecting food and in transport, and is highly specialised. It is often conducted in conjunction with poultry farming. The system includes piggeries conducted by Government Departments at Mental Hospitals and other institutions, and piggeries run in conjunction with butchering establishments.

(5) Stud piggeries associated with dairy farming and commercial pig farming ventures, or on a small scale under the general heading of suburban pig farms, or as a specialised business at Agricultural Colleges and State Experiment Farms. The stud pig business is one requiring a special knowledge, and needs to be conducted on strictly business lines to

be a success. The capital required depends entirely upon the scope of the business, though stud breeding has its limitations, and is more profitable when conducted in conjunction with one of the other systems referred to than as a special line of work. There is, however, ample scope for enthusiastic and capable men to develop this class of pig farming.

(6) Junior Pig Farmers. Included in this section are those enthusiastic and progressive members of Pig Clubs whose operations, while

Plate 41.

Fig. 1.—An unprofitable and expensive litter, sometimes referred to as "a pretty but unprofitable lot." Unless breeding sows rear two litters per year of at least eight pigs in each litter, they are not profitable, and should promptly be replaced with more prolific strains. Prolific strains can be obtained if breeders invest in the best it is possible to secure.

conducted on a limited scale, are of importance to the industry. As the Pig Club movement expands thousands of club members will be enrolled, many of whom will eventually enter the ranks of senior pig farmers.

Number of Breeding Sows Required.

Where pig raising is conducted as an adjunct to dairying, it will be found, as a general rule, that one breeding sow to every ten cows, in milk, will be about the correct proportion to keep. Experience proves that the farmer milking sixty cows comfortably handles six sows and one boar together with young pigs, provided some additional food is grown or purchased to supplement the milk. If accommodation and additional food supplies are available, or if other systems of pig raising are followed, it may be possible to increase the number of pigs kept, but it is better to have food to spare than to lose money by having more pigs than can be comfortably fed and profitably produced.

Pigs should not be used for breeding before they are ten months old, and if carefully handled and kept in reasonable breeding condition both sows and boars should be productive up to the age of six years or even eight years.

The Importance of Correct Feeding.

The whole subject of foods and feeding is of very great importance to the farming community. The Department of Agriculture and Stock has in course of preparation a complete treatise on this important subject.

Milk.—Skim milk, butter-milk, and whey are all excellent foods for the purpose of pig feeding, but their value may be considerably enhanced by balancing them up with concentrated foods, mineral matters, and greenstuff. Clean drinking water in a separate trough is always necessary even where these by-products of the dairy form part of the food.

Greenfoods.—Succulent greenstuff should form from 25 to 30 per cent. of the food supply at all seasons of the year, and where green food is not available, lucerne hay or lucerne chaff (soaked in water when first being used) should be substituted. Green lucerne, rape, barley, wheat, oats, sorghums, green cornstalks, pumpkins, melons, grasses, &c., are all advised.

Root Crops.—Of these, sweet potatoes, artichokes, unmarketable English potatoes, and mangel wurzels are recommended as being reliable, nutritious, and economical additions to the list of foods. Peanuts may be used in the feeding of very young pigs and breeding stock, but should be omitted from the rations of fattening pigs.

Grain Crops.—Corn, wheat, barley, oats, peas, grain sorghums, &c., are all advised together with the meals resultant from grinding these grains (maize meal, wheat meal, barley meal, pea meal, pollard, bran, milo meal, &c.), but care should be taken not to feed an excess of fattening food such as maize, peanuts, or even milk, otherwise the pork and bacon may be too fat and of much lower value than would be the case if balanced rations were fed. Even pigs of correct factory weights are often over-fat and unsuited to trade requirements. *This is a point that must not be overlooked.*

Concentrated Foods, Meals, and Mineral Mixtures.—Meals such as protein meal, meat and bone meal, specially prepared pig meal, &c., all provide useful and necessary supplements to the foods used, those supplying protein (flesh formers) being specially advised. Mineral mixtures supplying bone-forming elements (lime, potash, phosphates, &c.), charcoal, wood ashes, bone meal, &c., become more necessary every year, and are, without doubt, very profitable additions to the daily food supply. Other foodstuffs such as molasses, lime water and linseed meals have a place, too, but need to be used judiciously, otherwise unnecessary waste will result.

Vitamins (health and energy producers).—These must be supplied per medium of balanced rations in which green foods have a part.

Water.—A permanent supply of *clean drinking water* is absolutely essential for all classes of live stock.

Notes on Feeding.

Pigs have big appetites; they must consume large quantities of nutritious food to enable them to develop and mature early, for with a capacity as baconers to reach 170 lb. live weight in 170 days from birth (birth weight about 2 lb.), and with a ratio of approximately 4 to 5 lb. of food (dry matter) plus water to each pound of pork produced, it will be seen that the modern "pork-making machines" must be fed. It is a mistake to think that pigs can be produced at a profit at no cost at all. The farmer should keep books and ascertain just how he stands in regard to these matters. Seasonal conditions would not hinder our

Plate 42.

Fig. 2.—Early maturing bacon pig, of a mellow desirable type, and of correct factory age and weight. Note evenness of development—light forequarter and fine quality skin and hair, indications of a healthy vigorous constitution. Pigs such as this will always realise top price. Live weight 170 lb. at six months of age.

progress if we conserved food and water and worked more along sound progressive lines.

Ask for the pamphlets on "Foods and Feeding," "Stock Foods," &c., to be supplied to you as soon as available.

Breeding for Profit.

Efficient management is an important factor in the success of every business, and as a business pig raising must be conducted efficiently to be profitable. No other than purebred boars should be used, and the brood sows should carry all the breeding possible! If they are purebred so much the better. Mongrel stock pay no profits.

Good quality breeding sows are procurable (January 1929) up to twelve months of age at from £3 13s. 6d. at twelve weeks to about £12 12s. each. The higher-priced animals would probably be quoted as being in-pig, twelve months in age, and right at the productive stage. Pedigreed boars of the various breeds are available at from £4 14s. 6d. at twelve

weeks old to £12 12s. or more at twelve months old. Specially selected animals at higher prices than these may also be obtained.

It has been said that "Half the Breeding is in the Feeding," though it would be equally true in pig breeding to add that it is impossible to expect good results from feeding inferior quality, slow-growing strains of pigs. A good sow mated to a superior quality boar will produce pigs worth twice as much as those produced by mongrel stock, while cost of production is lower in the former than in the latter. It is not to be expected that pigs will grow rapidly and produce profitable returns unless improved breeding and selection go hand in hand with correct feeding and management.

Breeding sows should produce two litters per year of at least eight pigs in each litter. Assuming that a sow rears six pigs in each litter, and that these pigs are worth £3 10s. each as bacon pigs when between five and six months of age, a gross return of £21 per litter or £42 per sow per year after the first year should be possible, and at the end of the year the sow herself should be carrying another litter of pigs worth practically £1 each at birth.

IT DOES NOT PAY TO HANDLE INFERIOR TYPES OF PIGS.

But many pig raisers are keeping unprofitable sows. There is big scope for improvement here.

The pig industry suffers considerable economic loss each year through the retention on farms of unsatisfactory breeding sows, i.e., sows only producing one litter of less than eight pigs per year instead of two of more than eight each, and through the use of crossbred, mongrel, lazy, and unproductive boars.

Special Note.—Unfortunately many farmers depend upon the purchase of store pigs, and for these, at times, high prices are paid, and the margin of profit is considerably reduced. It is desired to advise producers against relying unduly upon the fattening of store pigs for profit, and to stress the value of breeding the pigs on the farm. The purchase of store pigs at comparatively high prices for sale later as baconers at an uncertain value is not in the best interests of the producer nor the business, nor are the risks involved to be recommended.

Experience in Queensland proves that where pig raising is conducted on proper lines it is a profitable undertaking; it indicates that the business is one from which farmers in every part of the country are making satisfactory returns.

Care of Young Pigs.

The profitable pig should grow rapidly, mature early, and reach the bacon factory at the earliest possible age, at the lowest cost of production, with the least amount of labour, and with the maximum of saleable meat and a minimum of waste.

The business of the pig farmer is to help the pigs in their progress from birth to factory, and to market them in the most attractive and desirable form.

The time to begin caring for pigs is long before they are born, for the strength and development of the pigs at birth depends entirely upon the feed, care, and attention given to their mothers, and the type and quality of the sires. The Departmental pamphlets dealing with "Selection of Boar and Sow," "Feeding the Pig," "Weaning the Pig," "Castration of Pigs," &c., all carry much valuable information on this phase of the business, and to these pamphlets readers are referred. The pamphlets are free on request at the Department of Agriculture and Stock, Brisbane.

DISEASES OF PIGS.

Prevention is Better than Cure.

The factor of importance in the ultimate profit to the individual pig raiser concerns the exercise of care in the prevention of disease. The ravages of Swine Fever and Foot and Mouth Disease, &c., in other parts of the world indicate the absolute necessity for strict attention to hygiene, and to keeping nothing but the healthiest animals obtainable under conditions as near perfect as possible. Fortunately, stock in this country are exceptionally healthy, our conditions favour quick growth and early maturity, and we have but little fear of calamity through the more serious infectious and contagious diseases.

Losses through disease and parasitic infestation are, however, sufficiently serious to warrant the closest investigation and to require that the strictest measures be observed in all operations associated with the business.

Investigations into the incidence of disease among pigs are undertaken by veterinary officers of the Department of Agriculture as required from time to time, the object being to definitely locate the origin and whereabouts of the principal diseases among pigs.

These investigations are followed up by visits of Departmental officers to the farms upon which the diseased animals were located. Reports and "Follow up" correspondence with the farmer aim at clearing up the troubles and freeing the stock and farm of disease. A pamphlet dealing with "Diseases of the Pig" and suggested lines of preventive measures and treatment is in course of preparation. **Ask for a copy to be posted to your address as soon as available.** Write the Department at once if you experience any trouble amongst your pigs.

Proper Housing will Aid in Profit Making.

The pig has frequently been designated as the "gentleman who pays the rent," "the mortgage lifter," &c. The appellations have much truth in them. The pig *is* a money maker, but the "gentleman who pays the rent" is too often left without a house or paddock for himself although he is expected to pay the rent for his owner. Time was when "wallowing in the mire" was deemed to be the natural environment and preference of the pig, and nothing more was deemed necessary or desirable. Times have changed, and to-day there is no greater fallacy than that the pig's natural environment is in a filthy, dark, low, ill-ventilated dungeon. The fact is that, in pig raising as in other avenues of life, "Cleanliness is next to Godliness," and is an absolute necessity in any system of pig farming. With climatic conditions as they are in Queensland expensive pigsty accommodation is unnecessary; it is much more profitable to spend the money on the purchase of wire-netting, barbed wire, and cheap, convenient, comfortable open-fronted shelter-sheds than on the more elaborate pigsties thought so necessary years ago and still an advantage in colder countries. Pig paddocks, not pig

Our slogan should be not necessarily more, but
BETTER PIGS ON EVERY FARM.

yards or pens, should be the objective, for even pigs being topped up for the market will finish off much better if allowed liberal exercise and green foods than if penned up continuously and fed chiefly on grain. Breeding sows should not be penned up continuously, but should have large grassy paddocks in which to graze. It is, however, an advantage to confine very young pigs in roomy pens; also sows with very young litters. Write to the Department of Agriculture and Stock for information relative to these matters, and state the conditions under which your pigs are being controlled.

Losses in Transit.

It is not sufficiently realised that the profits from the breeding and feeding of pigs on the farm may be seriously reduced by careless handling and by bruising. Though the pig has a stubborn temperament and is not always ready and willing to travel in a direction contrary to his liking it is surprising how readily he may be handled if those in charge have patience and avoid reprisals. A visit to the bacon factory and inspection of bruised and damaged carcasses, hams, &c., impresses one with the necessity for care in handling, for there one notices hams and flitches showing distinct evidence of boot and whip marks and other injuries to the flesh which, in the aggregate, result in heavy financial loss to the producers. Visits by parties of farmers to bacon factories for the purpose of becoming more conversant with all these details are strongly recom-

mended. The instructors will accompany such parties if advised in ample time beforehand. Every farmer should make a point of coming into personal contact with those who are engaged in the manufacture and sale of the product from the stock they are producing. The system of transport of pigs organised by the Northern Pig Board in Queensland

SEVEN POINTS ON COST REDUCTION.

As it is essential that the costs of production be kept at the lowest possible level the attention of readers is drawn to seven points in cost reduction, all of which have a direct bearing on control of the business on the farm.

Reduce your production costs by—

(1) The growth and use on the farm of as large a proportion of the food supply as is possible.

(2) The use of a liberal supply of flesh- and bone-forming materials, as well as fat formers; we invariably use too much cob corn (grain) and too little green corn (greenstuff). The pigs on most farms have too limited a supply of drinking water, greenstuff, and mineral matters; add these to the ration and mark the difference.

(3) Allowing the young pigs to suckle the sow till they are at least eight weeks old, in preference to weaning them at six weeks. This is well worth a trial. Castration of male pigs before weaning is strongly advised.

(4) Keeping only the most prolific sows and those that produce the most milk—cull out the weedy, unproductive sorts, the non-rent payers. Three good sows are better than six mongrels. Pigs are only rent payers when bred and fed along the correct lines.

(5) Keeping a purebred boar, selected from prolific, "milky" strains of healthy well developed stock. This applies also to sows. It is an unfailing axiom of stock breeding that "Like produces Like."

(6) Remembering that the more pigs reared per litter and the more pigs reared per sow per year, the cheaper the cost of production of those marketed.

(7) Raising pigs of the most desirable quality within the desired weights, marketing them at the earliest possible age and with a minimum of waste.

Explanatory Note.

It should be noted that the terms "Cost of Production" and "Cost Reduction" do not necessarily refer only to cost of feeding or to the value of the foods consumed; there are other economic factors influencing production costs.

is worth emulation. The Board has reduced costs of transport and losses in transit to a minimum without any inconvenience to the producers. In transport exists a field for organised co-operation of pig raisers in other parts of the State.

There is an economic loss to the industry through railway pig wagons travelling long distances carrying fewer pigs than their maximum capacity allows. In the transport of pigs by rail (loose in wagon)

half or full truck rates invariably apply; if a pig wagon with a capacity of seventy bacon pigs carries say, only fifty pigs, this number of animals is charged for at the full truck rate (seventy pigs) and the cost of freight per pig is 25 per cent. higher than it ought to be. Similarly, if ninety pigs are delivered to the railway station for trucking to the one destination on the same day, two pig wagons would have to be utilised, and in this case one full truck (seventy pigs) and one half truck (thirty-five pigs) would be charged for and ninety pigs would pay the freight ordinarily paid for 105 head. There is also less damage through bruising when pig wagons are loaded to their maximum capacity than is the case where fewer animals are forwarded. This suggests the advantages of greater effort in the direction of co-operative trucking. An appreciable saving in freight and loss reduces cost of production and increases the profits.

The loss to the industry through bruising and damage in transit and through condemnation at slaughter, in part or whole, also increases the cost of production of the stock marketed to a considerable extent and necessarily reduces profits. These and other avoidable losses are often overlooked by the producer on the farm. Farmers should consult their factory representatives regarding all these matters.

What Pig Industry Statistics Teach.

The latest figures available indicate that the human population and the numbers of pigs in some of the principal pig-raising countries throughout the world are approximately as follows. The percentage of pigs per cent. of human population is stated in the fourth column.

PIG-RAISING STATISTICS.
(From Stateman's Year Book for 1928.)

Name of Country.	Number of Pigs.	Number of Inhabitants.	Number of Pigs per cent. of population.
Denmark	3,728,623	3,434,555	108·56
United States of America	58,969,000	105,720,620	55·77
Canada	4,470,771	8,788,483	50·87
Irish Free State	1,177,637	2,972,800	39·61
New Zealand	520,143	1,344,384	38·69
Germany	22,880,318	63,180,619	36·21
South America	20,652,000	66,512,885	31·04
Hungary	2,386,664	8,457,852	28·21
Spain	5,267,328	22,290,162	23·63
Yugoslavia	2,806,182	12,017,323	23·35
Queensland	191,947	897,419	21·38
Tasmania	38,906	210,529	18·48
West Australia	69,798	385,043	18·12
Victoria	284,271	1,726,445	16·46
New South Wales	332,921	2,361,950	14·09
South Australia	79,108	570,900	13·85
Great Britain and North of Ireland	3,124,412	45,448,000	6·87

The figures quoted above are from the latest information available though it does not follow that they represent the census for the same period throughout.

The figures indicate the possibilities of the pig-raising industry if judiciously organised and controlled; they also emphasise that in comparison with the development that has taken place in other countries, the industry is as yet in its infancy in Queensland, this, especially so, considering the vast tracts of fertile country not yet in a productive stage from the pig farming point of view. Denmark, it will be noted, is in reality, the most important pig-raising country in the world, for with a human population approximately 50 per cent. less than Australia she has more than five times the number of pigs per cent. of human population than we are credited with. Here is emphasised the value of pig raising as an adjunct to dairying in centres suited to a combination of these two important branches of farming. Denmark's success should be an incentive to Australians to make still further progress, though here it would be well to remark that in advocating expansion of the industry we do so with the full knowledge that it is essential to improve the quality if quantity is to be increased.

¶

Some Notes on Production and Consumption.

Experience in Queensland proves that, following on any dry spell in the weather, there is invariably a rapid return to normal conditions and appreciably increased production during periods characterised by liberal rainfall.

Adverse seasonal conditions constitute one of our greatest problems, but as they are inseparable from agricultural development in sub-tropical countries they must be taken into account, and in consideration of our problems must of necessity be faced. Other industries both agricultural and industrial have their "ups and downs," and in this respect the pig farmer is no better or no worse than his neighbours; **increased efficiency and reduced costs of production together with more co-operative** effort in the manufacture and distribution of the finished products will always prove of immense advantage no matter in what condition the pork products market may be.

From a study of available statistics the position appears as follows:—

In 1926-27 the bacon and ham produced in Australia totalled 73,634,888 lb.; the exports were 1,833,832 lb. and imports 374,824 lb., leaving a surplus of 1,459,008 lb. of exports over imports. The total consumption requirement for the Commonwealth, therefore, was 72,175,880 lb. or on an average 12·05 lb. per head of population. The total exports exceeded the imports by 1,459,018 lb. An increased consumption of slightly more than 3 oz. per head of population per annum would absorb the whole of the surplus production.

This increased consumption necessitates better pork products, the quality of which is contingent upon the class of pig raised. An all round improvement in quality is therefore necessary to insure future success and expansion. Increased local consumption also means less surplus and more reliable prices for the products available.

According to the Commonwealth Statistician, of the total of 244 lb. of meat, which every Australian consumes during the year, only 11 lb.

PLATE 43.

FIG. 3.—Carcass of bacon pig reduced in value more than 50 per cent. through over-feeding and holding the pig too long on the farm. Bacon pigs of this description were in demand many years ago, but during recent years they have become exceedingly unpopular and unprofitable. Note short, thick-set body, heavy forequarter, and short "bully" neck.

Plate 44.

Fig. 4.—In striking contrast to Fig. 3 this prime quality fleshy bacon pig realised top market rates, and is in much demand throughout Australia. Note increased length of body, evenness throughout, and large proportion of lean to fat. There need be no fear of over-production of the correct type and weight in bacon pigs.

consists of bacon and ham, and 7 lb. of pork and lard. During the same year the same Australian consumes 158 lb. of beef and 68 lb. of mutton and lamb. The average Canadian consumes 87 lb. and the American 77 lb. of pork products each year in addition to other meats. This indicates that there are thousands of homes here that rarely serve pork products in their dining-rooms, and impresses upon those interested in pig production the possibilities ahead of the industry when Australians can be induced by improvement in quality of the products to consume more pork, bacon, ham, &c.

Quality dominates the position in any market, hence quality products should be the dominant factor with every individual farmer engaged in developing the industry, and with every unit engaged in manufacture and distribution. We must modernise our methods if we are to expand.

It is quite certain also that if the supply of suitable pigs to the various factories were more regular and of more reliable and suitable type better values would be obtained at all seasons of the year.

There is no reason why Australia should not be self-contained so far as the raising and consumption of its pig products are concerned.

Market Requirements Paramount.

The paramount consideration in the maturing of pigs is the market requirement. Pig raisers producing pigs of weights, quality and condition other than those especially required are losing money. From the table figuring out the market classification of pigs and factory values it will be noted that there are different grades, all of which vary both in age and in weight as well as in commercial value. **It certainly does pay to study market requirements and to be fully informed as to the correct age, weight, condition, and value.** There is more need to-day than at any previous stage in our history for a careful study of the requirements of the various markets, for competition is keen, market demands urgent, and the consumers more determined that they will only buy and pay for such goods as suit their own particular fancies. The consumers' demands must be catered for if the business is to become a profitable one. In the marketing of pork and bacon pigs there is no demand for very heavy, fat pigs of any description.

Boars or stags with long sharp tusks, rigs, ruptured stock, rough staggy pigs, cripples, aged and worn-out sorts, wild or bush pigs, thin, weak, rickety, damaged or diseased animals, or huge, over-fat, and very coarse pigs **are of no value at all, and should not be sent in or offered for sale. It does not pay to feed or handle such stock no matter how cheap they appear to be at auction or by private contract.**

Purchasers are only attracted by quality pigs of the most desirable type. **One prominent manufacturer recently remarked at a public gathering in Brisbane that 50 per cent. of the pigs coming forward to Queensland bacon factories were too fat and too heavy to realise top**

prices. In this direction producers must surely be at fault, and they cannot expect all-round top prices if so large a percentage of pigs are not of desired condition and weight. Further particulars in regard to prices, conditions of sale, &c., may be obtained on application to the managers of the various factories.

QUEENSLAND BACON FACTORIES.

Name.	Factory at
Conaghan Bros. Ltd.	East street, Rockhampton.
Darling Downs Co-operative Bacon Company, Ltd.	Willowburn, via Toowoomba.
Foggit Jones Pty, Ltd.	Oxley, near Brisbane.
Huttons, J. C., Pty., Ltd. ..	Zillmere, near Brisbane.
North Queensland Co-operative Bacon Company, Ltd.	Floreat Siding, Mareeba, North Queensland.
Queensland Co-operative Bacon Association, Ltd.	Murarrie, near Brisbane.
Reeds, Ltd.	Ann street, Maryborough.
Warwick Bacon Company ..	Mill Hill, near Warwick.

Marketing Pigs in Queensland.

This trade classification of the various grades of pigs has special reference to average age and weight in Queensland, and may be accepted as a reliable guide in the marketing of this class of stock.

Trade Classification—Queensland Pigs.

Name or Grade of Pig.	Approximate Age.	Approximate Weight.
Sucker or Sucking Pig ..	6 weeks	25 lb., live weight
Weaner	8 weeks	35 to 40 lb., live weight
Slip	10 weeks	45 lb., live weight
Store	12 to 14 weeks ..	55 to 65 lb., live weight
Light Porker	4 months	65 to 75 lb., live weight
Medium Porker	4½ months	85 to 95 lb., live weight
Heavy Porker	5 to 5½ months ..	115 to 135 lb., live weight
Light Baconer, Prime ..	5 to 5½ months ..	115 to 135 lb., live weight
Medium Baconer, Prime ..	5½ to 6 months ..	140 to 170 lb., live weight
Heavy Baconer, Prime ..	6 to 6½ months ..	170 to 175 lb., live weight
Heavy Baconer	Over 6 months ..	175 to 185 lb., live weight
Heavy Baconer	Over 6 months ..	185 to 197 lb., live weight
Heavy Baconer	Over 6 months ..	197 to 216 lb., live weight
Backfatter	Up to 4 or 5 years ..	Up to 4 cwt., dressed weight
Stag	Up to 4 or 5 years ..	Various weights
Chopper	Up to 2 years or more	Up to 3 cwt., dressed weight, or heavier
Boars	Over, say, 4 to 6 months	These are unmarketable as meat pigs

Values for these various grades of pigs vary considerably with age, quality, condition, weight, from around 12s. 6d. for a sucking pig up to

£3 10s. or more for prime quality baconers. For bacon pig values current in Queensland in February, 1929, see bacon factory buying charts featured hereunder.

*CO-OPERATIVE BACON FACTORIES BUYING CHART, QUEENSLAND, 4TH FEBRUARY, 1929.

NOTE.—Live weight column not included in this chart.

Actual Dressed Weight.	Rate per lb.	Value per Pig.†	Actual Dressed Weight.	Rate per lb.	Value per Pig.
	d.	£ *s.* *d.*		*d.*	£ *s.* *d.*
86 lb. ..	6 0	2 3 0	124 lb. ..	6·77	3 10 0
87 lb. ..	6·10	2 4 3	125 lb. ..	6·72	3 10 0
88 lb. ..	6·25	2 5 10	126 lb. ..	6·57	3 9 0
89 lb. ..	6·40	2 7 6	127 lb. ..	6·47	3 8 6
90 lb. ..	6 50	2 8 9	128 lb. ..	6·37	3 8 0
91 lb. ..	6·60	2 10 0	129 lb. ..	6·27	3 7 6
92 lb. ..	6·70	2 11 4	130 lb. ..	6·18	3 7 0
93 lb. ..	6·80	2 12 8	131 lb. ..	6·09	3 6 6
94 lb. ..	6·90	2 14 0	132 lb. ..	6 0	3 6 0
95 lb. ..	7 0	2 15 5	133 lb. ..	5·90	3 5 6
96 lb. ..	..	2 16 0	134 lb. ..	5·82	3 5 0
97 lb. ..	..	2 16 7	135 lb. ..	5·74	3 4 6
98 lb. ..	..	2 17 2	136 lb. ..	5·64	3 4 0
99 lb. ..	..	2 17 9	137 lb. ..	5·51	3 3 0
100 lb. ..	..	2 18 4	138 lb. ..	5·39	3 2 0
101 lb. ..	..	2 18 11	139 lb. ..	5·26	3 1 0
102 lb. ..	..	2 19 6	140 lb. ..	5·14	3 0 0
103 lb. ..	..	3 0 1	141 lb. ..	5·01	2 19 0
104 lb. ..	..	3 0 8	142 lb. ..	4·90	2 18 0
105 lb. ..	..	3 1 3	143 lb. ..	4·78	2 17 0
106 lb. ..	..	3 1 10	144 lb. ..	4·66	2 16 0
107 lb. ..	..	3 2 5	145 lb. ..	4·55	2 15 0
108 lb. ..	..	3 3 0	146 lb. ..	4·44	2 14 0
109 lb. ..	..	3 3 7	147 lb. ..	4·32	2 13 3
110 lb. ..	..	3 4 2	148 lb. ..	4·21	2 12 0
111 lb. ..	..	3 4 9	149 lb. ..	4·10	2 11 0
112 lb. ..	..	3 5 4	150 lb. ..	4 0	2 10 0
113 lb. ..	..	3 5 11	151 lb. ..	3·89	2 9 0
114 lb. ..	..	3 6 6	152 lb. ..	3·78	2 8 0
115 lb. ..	..	3 7 1	153 lb. ..	3·68	2 7 0
116 lb. ..	..	3 7 8	154 lb. ..	3·58	2 6 0
117 lb. ..	..	3 8 3	155 lb. ..	3·48	2 5 0
118 lb. ..	..	3 8 10	156 lb. ..	3·38	2 4 0
119 lb. ..	..	3 9 5	157 lb. ..	3·28	2 3 0
120 lb. ..	..	3 10 0	158 lb. ..	3·19	2 2 0
121 lb. ..	6·94	3 10 0	159 lb. ..	3·10	2 1 0
122 lb. ..	6·88	3 10 0	160 lb. ..	3 0	2 0 0
123 lb. ..	6·82	3 10 0			

* Chart published by courtesy of the Queensland Co-operative Bacon Association, Limited, Murarrie, Q.

† These prices are for prime quality bacon pigs only, as delivered to the Queensland Co-operative Bacon Association Factory at Murarrie, Q., and are based on the actual dressed weight of the animal after the carcass has been allowed to cool off. Pigs other than prime are paid for on a weight and quality basis, at the discretion of the factory directorate.

* Proprietary Bacon Factories, Queensland.

Schedule of Weights and Prices for Prime Quality Bacon Pigs, in operation as at 4th February, 1929.

Actual Live Weight.	Estimated Dressed Weight.	Rate per lb.	Value per Pig†	Actual Live Weight.	Estimated Dressed Weight.	Rate per lb.	Value per Pig†
		d.				*d.*	
135	90	6·50	2 8 9	176	126	6·57	3 9 0
136	91	6·60	2 10 0	177	127	6·47	3 8 6
137	92	6·70	2 11 4	178	128	6·37	3 8 0
138	93	6·80	2 12 8	179	129	6·27	3 7 6
139	94	6·90	2 14 0	180	130	6·18	3 7 0
140	95	7·0	2 15 5	181	131	6·09	3 6 6
141	96	..	2 16 0	182	132	6·0	3 6 0
142	97	..	2 16 7	183	133	5·90	3 5 6
143	98	..	2 17 2	184	134	5·82	3 5 0
144	99	..	2 17 9	185	135	5·74	3 4 6
145	100	..	2 18 4	186	136	5·64	3 4 0
146	101	..	2 18 11	187	137	5·51	3 3 0
147	102	..	2 19 6	188	138	5·39	3 2 0
148	103	..	3 0 1	189	139	5·26	3 1 0
149	104	..	3 0 8	190	139	5·26	3 1 0
150	105	..	3 1 3	191	140	5·14	3 0 0
151	105	..	3 1 3	192	141	5·01	2 19 0
152	106	..	3 1 10	193	141	5·01	2 19 0
153	107	..	3 2 5	194	142	4·90	2 18 0
154	108	..	3 3 0	195	143	4·78	2 17 0
155	108	..	3 3 0	196	144	4·66	2 16 0
156	109	..	3 3 7	197	145	4·55	2 15 0
157	110	..	3 4 2	198	146	4·44	2 14 0
158	110	..	3 4 2	199	147	4·32	2 13 0
159	111	..	3 4 9	200	148	4·21	2 12 0
160	112	..	3 5 4	201	149	4·10	2 11 0
161	112	..	3 5 4	202	150	4·0	2 10 0
162	113	..	3 5 11	203	150	4 0	2 10 0
163	114	..	3 6 6	204	151	3·89	2 9 0
164	115	..	3 7 1	205	151	3·89	2 9 0
165	115	..	3 7 1	206	152	3·78	2 8 0
166	116	..	3 7 8	207	153	3·68	2 7 0
167	117	..	3 8 3	208	154	3·58	2 6 0
168	118	..	3 8 10	209	155	3·48	2 5 0
169	119	..	3 9 5	210	155	3·48	2 5 0
170	120	..	3 10 0	211	156	3·38	2 4 0
171	121	6·94	3 10 0	212	157	3·28	2 3 0
172	122	6·88	3 10 0	213	158	3·19	2 2 0
173	123	6·82	3 10 0	214	159	3·10	2 1 0
174	124	6·77	3 10 0	215	159	3·10	2 1 0
175	125	6·72	3 10 0	216	160	3 0	2 0 0

Smallgoods sows 2½d. to 3d. per lb. with 30 per cent. deduction.

* Chart published by courtesy of Stock Agents, Ltd., Brisbane, representing Proprietary Bacon Factories, Q.

† These prices are for prime quality bacon pigs only, as weighed by Proprietary Company's buyer at Country Railway Stations and Trucking Yards. Other pigs are paid for on a weight and quality basis at the discretion of the buyer and the company he represents.

The prices quoted above represent a fair general average value for prime quality bacon pigs within the weights stated on the charts at Queensland bacon factories. In actual practice there would be practically

no deductions from these values under the buying systems common in the Northern State. Rail freights, charges for loading and forwarding, &c., are invariably paid by the Queensland factories, and, as far as is possible, live stock are given preference in quick transport over the railways.

Southern market quotations for pork and bacon as published in the daily and weekly press are invariably subject to heavier deductions due to the different system of marketing. There, in numerous instances, the transport and selling charges approximate 10s. per head more than they do in this State, as per figures quoted above. It is important to bear this in mind when comparing published market reports, as otherwise Queensland prices might be thought to compare unfavourably with those ruling in the Southern States.

While it will be noted that values fluctuate a good deal, and while pigs of one grade might readily be included in another and perhaps better grade, it can be taken as a general rule that the principal demand is for the medium or prime weight animal, whether marketed as porkers or baconers or included in other grades. There is in the North particularly a very limited demand for very light porkers or very heavy, fat pigs. The prime pig in good marketable condition with a firm yet mellow flesh and firm white fat is the one that is most profitable in the meat trade.

Having regard to the general trend of prices it would appear that there is little hope of permanently higher values in Queensland while the human population is so limited. There is all the more reason therefore for the devoting, by the pig raiser, of special attention to the finer points of the business to ensure a remunerative return.

A Sum in Subtraction for the Pig Farmer.

By sale of—

	£	*s.*	*d.*
(*a*) One prime bacon pig, weight 120 lb., at 7d. per lb., dressed value	3	10	0
(*b*) One very heavy fat pig, weight 160 lb., at 3d. per lb., dressed value	2	0	0
Loss in cash through over-fattening (*b*)	1	10	0
Plus increased cost of feed, labour, freight, and risk involved in holding (*b*), say	1	0	0
Total loss incurred through over-fattening pig (*b*) by 40 lb. or more	2	10	0

The point emphasised here is that **a detailed knowledge of market weights and values is essential in the production of pigs for profit. Without such knowledge the business cannot prove profitable.**

A Sum in Multiplication for the Pig Farmer.

By utilising the food, time, labour, risk, &c., used in producing the unprofitable pig (*b*) referred to above, showing a loss of more than 1s. per lb. of the surplus fat and weight—in topping up one bacon pig 86 lb. dressed weight, valued at 6d. per lb., £2 3s.—(and not in general demand at all the factories) to prime bacon weight 120 lb., and valued at £3 10s., a net profit (at no additional expense) of 10s. may be gained instead of the loss varying from £1 10s. to £2 10s. after allowing 17s. as the approximate cost of feeding.

Attention is again drawn to the statement made elsewhere to the effect that 50 per cent. of the pigs coming forward are unsuitable for the market. Big losses are being sustained by pig raisers in consequence.

Weighing the Pigs on the Farm.

The provision on the farm of a properly constructed platform scale and crate with which to weigh the pigs at regular intervals, and especially prior to marketing, is an essential to the success of the business, particularly now that condition and weight are such important items in pig marketing.

A suitable outfit may appear costly and beyond the means of the average farmer, but observation and experience prove its provision to be quite as necessary in the marketing of pigs as are the class of milk

To raise the consumption of pork products from 12 lb. to 20 lb. per capita in Australia (a very desirable objective) would mean the consumption of 500,000 additional pigs each year if the population stood still. Happily the population does not stand still, it increases at the rate of 200,000 per annum, and with consumption at 20 lb. per capita it would mean a further 40,000 pigs each year.

Who is to say this is not possible provided pig raisers enter whole-heartedly into an intensive advertising campaign to tell the consumer what an excellent and nutritious product they have to offer.

and cream cans recommended in the marketing of these dairy products; the bushel, half bushel, standard and other containers in the marketing of fruit; and the correct type of sacks in the marketing of cereals, &c.

Bacon factories do not purchase pigs now except on an actual weight (live or dressed) and condition basis; nor should the farmer guess the weight and lose money. It is only by having up-to-date equipment in stock, plant, and knowledge that maximum profits may be expected.

A comparison of the prices paid for pigs of the same quality and condition but of varying weights proves enlightening, and demonstrates the urgency of making every possible provision to satisfy the exacting requirements of the markets.

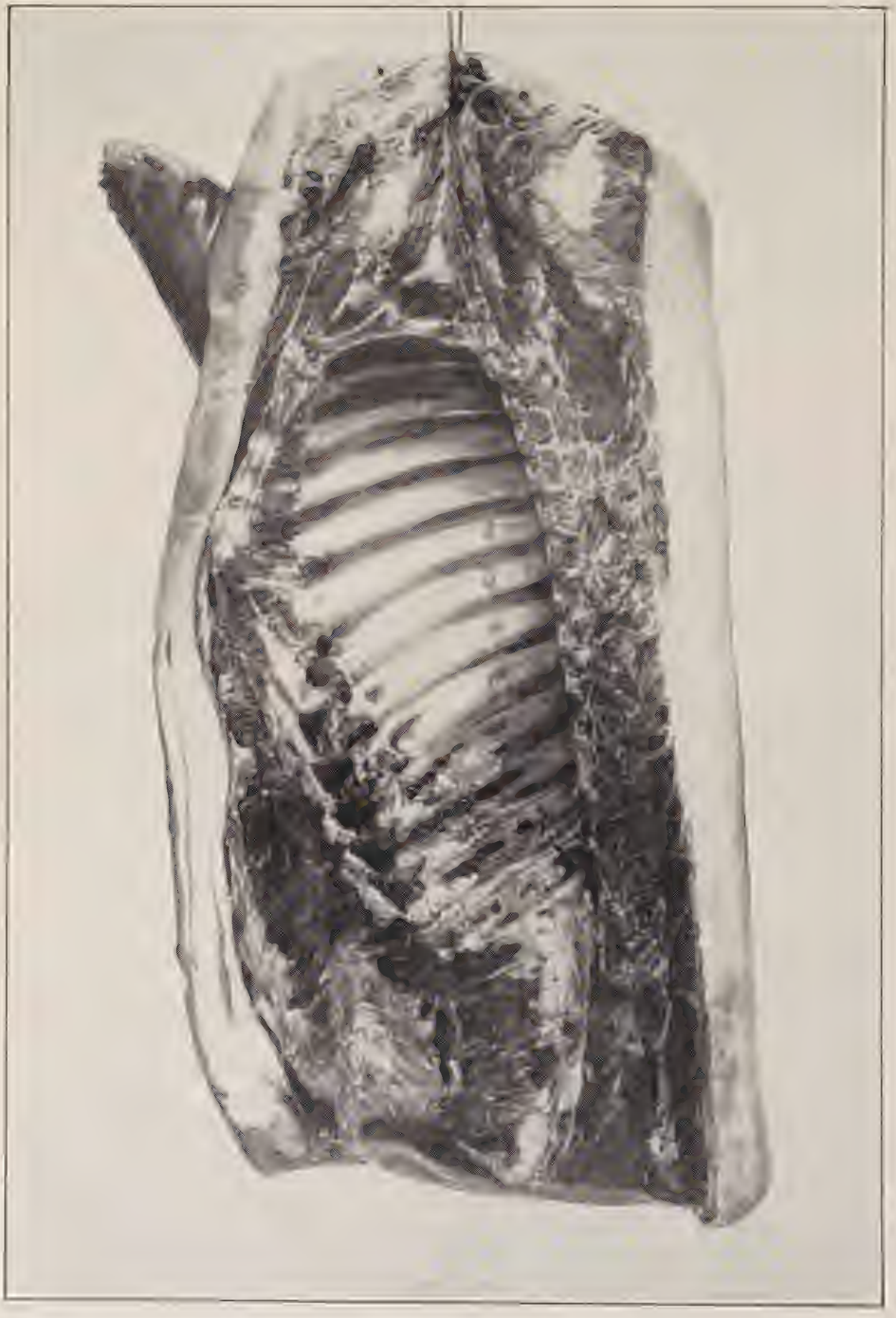

PLATE 45.

FIG. 5.—Heavy, over-fat flitch, much depreciated in value by its weight (36 lb.) and thickness of fat along back. Factories have difficulty in disposing of bacon of this description, even at a considerable discount. It does not pay them, nor is it a good business proposition to the farmer. Study the factory charts and compare prices for confirmation of this statement.

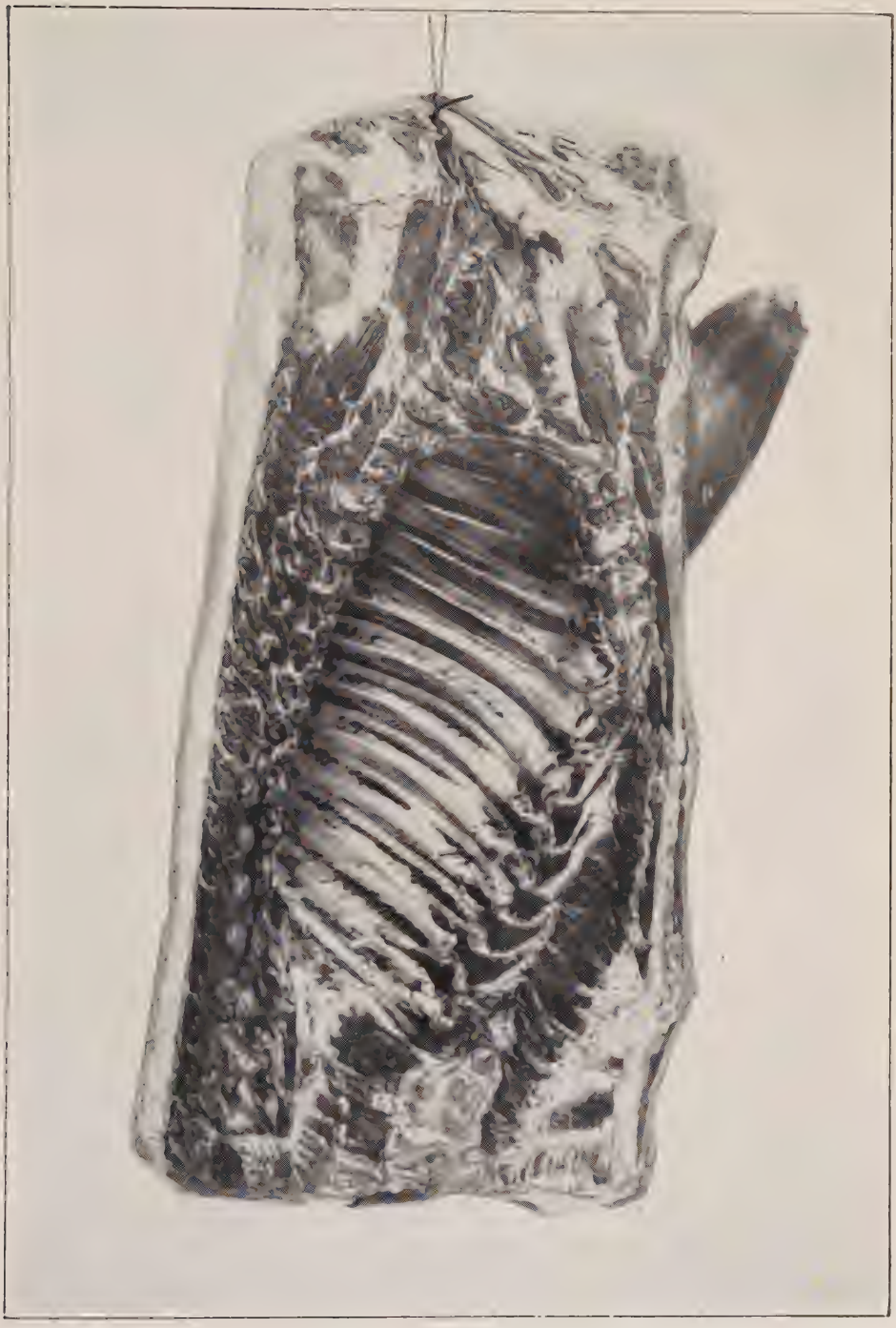

Plate 46.

Fig. 6.—Prime quality, deep-bodied flitch of bacon of good trade weight (27 lb.). Note evenness of fat along back and fleshiness of the flitch throughout. This was from a pig of desirable trade weight and condition. Desirable weight for flitches of bacon is from 24 to 27 lb. each.

Marketing Organisation.

As will be noted from the data in this pamphlet, there is much in the way of improvement which can be affected at the production end. Attention to marketing requirements by the individual pig raiser is the first step in effective marketing organisation. The helping hand of Departmental officers is available on request, and every assistance will be gladly and willingly rendered. Pig raisers in general should seek to attain the high standard already set by many progressive men engaged in the

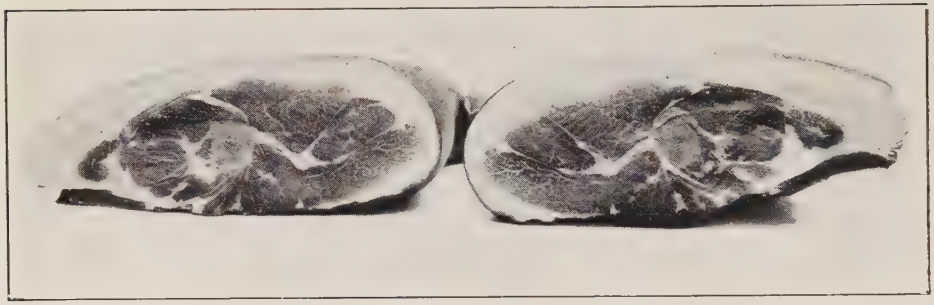

Plate 47.

Fig. 7.—This ham, while of excellent quality, and with the fat evenly marbled through the lean, was too fat and too heavy for best trade requirements. Its weight, 18 lb., limited its sale to ham and beef shops, restaurants, &c. It does not pay to over-fatten pigs or to market them when over the desired factory weights. Popular factory weights for hams are from 12 to 14 lb. Hams 9 to 10 lb. in weight are not usually prime enough, while those over 14 lb. weight are in poor demand.

industry. Pig raisers on the one hand and bacon curing establishments on the other must realise that their interests are closely related and that they must work in unison in order to ensure the prosperity of the pig-raising industry.

Primary obstacles to improvement in the marketing sphere are as shown herein—first, the irregular supplies of pigs, and second, the large proportion of pigs marketed which are of unsuitable weights. With these obstacles removed by the concentrated effort of the individual pig raiser there will be good ground for closer collaboration by producing interests with the manufacturers in other directions.

An object lesson is to be found in the operations of the Northern Pig Board established in the year 1923 under the agricultural legislation introduced by the Queensland Government. As a result of organised co-operation pig prices in the Northern area are now on a par with those ruling in Southern Queensland, and a new industry has been created. During the year ended 30th June, 1928, the Northern Pig Board handled 9,626 pigs. The pigs produced are allocated as between the pork market and the bacon market, those most suitable for the latter trade being treated by the Co-operative Bacon Factory with which the Pig Pool Board is allied. The return to the Northern pig raiser is the average between the price realised for pork through the butchers within the area, and that available through the bacon market.

There are many directions in which the co-operative enterprise

exemplified in Northern Queensland may be emulated in the Southern part of the State, but the primary consideration at the moment concerns the organising of that part of the business which is within the sphere of the individual pig raiser himself.

Departmental Officers offer a Helping Hand.

It is with the object of assisting the farmer to become more efficient and to enable him to make more profit out of his pigs that Departmental officers have entered so vigorously into the instructional campaign among pig raisers. The Instructors have spared no effort to place themselves in direct touch with producers and at the same time to work in co-operation with all other branches of the trade. It is satisfactory to note the spirit of confidence thus engendered and to know that pig raisers are looking more and more to the Department of Agriculture and Stock for information and advice as to the best methods of procedure and as to future progress.

Agricultural Extension Services.

Through the medium of correspondence and personal interviews dealing with every phase of the industry and with the activities outlined above, the services of the Department are made available to farmers in every portion of the State. The "Queensland Agricultural Journal" and the city and country Press provide media through which valuable information is conveyed to the farming community. The aim is to provide every farmer with the most up-to-date information it is possible to secure. The Instructors in Pig Raising invite you to communicate with them regarding your problems, whether they have reference to the control of stock in health or in disease or on any other aspect of the business. **You are urged to avail yourself of their advice and assistance.**

Official Itineraries and Farm Visits.

The Instructors in Pig Raising travel extensively on itineraries during which personal visits are paid to farmers engaged in pig raising. That these visits are appreciated is clearly indicated by the kindly welcome extended to visiting officers, and by the many friendships formed with the farming community in every district visited.

Schools of Instruction.

The success of the initial Pig Farmers' School, held at the Queensland Agricultural High School and College, Gatton, in June, 1928, indicates the possibilities ahead of this form of instruction which appeals especially to those of the farming community who have recently left school and have taken their places on the farm; indeed, it appeals to senior farmers also, many of whom are only too pleased to have the opportunity thus afforded, of adding to their knowledge of the industry. **You are invited to write for particulars to the Principal, Queensland Agricultural High School and College, T.P.O. South, Gatton, Queensland.**

ENCOURAGEMENT OF JUNIOR AND ADULT FARMERS.

Boys' and Girls' Pig Clubs.

Queensland leads the way in Australia in the development of the Boys' and Girls' Pig Club Scheme. Clubs have been organised and club contests arranged in many districts in the Southern and Central Divisions of the State, and, in due course, clubs will also be in operation in North Queensland. In the development of this scheme officers of the Department of Agriculture and Stock co-operate with officials of the Department of Public Instruction, and their efforts are backed up by enthusiastic club members, local committees, agricultural show societies,

PLATE 48.

FIG. 8.—This junior farmer, whose pigs were penned in a Queensland Pig Club contest, did not have much to spend on pig sty accommodation, but as he promptly replied when asked a question about pig pens, "Well, I like my pig's pen to be roomy and comfortable, so that it is easily kept clean and is cool and airy even on a very hot day." The boy and his pigs certainly look contented, and in each case cool and comfortable.

&c., in the districts in which clubs function. The scheme has boundless possibilities, and from former successes it is evident in years to come that thousands of junior and senior farmers will be trained by the clubs, and will become more efficient farmers as a result of their association with this scheme of practical instruction. These clubs are intensely practical, the rules of membership requiring each club member to secure a suitable pig with which to enter the contest. Provision is made for porkers and baconers of the various grades as well as for stud pigs, and in general each club runs for a period of approximately four months. The scheme allows for visits of Instructors to the homes of the club members for the purpose of an official inspection and for club tours, picnics, contests, meetings, and other formal and informal gatherings.

Club members have been singularly successful in the preparation of porkers and baconers for market and have shown appreciable profits. Those possessing stud pigs have proved that they can compete on even terms in the show ring with farmers having a much wider knowledge of the preparation of stock for show and for sale. A scheme providing for Senior Clubs in which boys and girls who have already left school may enter will shortly be in operation. Write to the Department of Agriculture and Stock, Brisbane, for particulars.

PIG CLUBS FOR QUEENSLAND BOYS AND GIRLS.

If you are interested in the Pig Club Movement, we shall be glad of your co-operation, for it is desirable that clubs should be in operation in every portion of the State suited to this branch of agriculture. All information available at the Department of Agriculture and Stock, and the Department of Public Instruction, Brisbane.

General.

The educational propaganda also includes the broadcasting from Station 4QG, Brisbane, of radio talks, a modern avenue through which farmers and their families over a widespread area are reached with beneficial results. Copies of the lecturettes are available on application.

The Queensland Government Agricultural Bank services are at the disposal of settlers engaged in pig raising. Under specified conditions advances are made to cover purchase of stock, &c., repayment being arranged for over a series of years. Full particulars may be obtained from the Manager of the Agricultural Bank, Brisbane.

Suitable breeding stock are made available at very reasonable prices to the farming community from several Government institutions, including the Queensland Agricultural High School and College, Gatton; the Mental Hospitals at Goodna, Willowburn, and Sandy Gallop; the Farm Home for Boys, Westbrook; and the State Farm at Kairi on the Atherton Tableland.

At these studs the stock available are of the best type it is possible to secure, and they are bred along approved lines for high production and profit. Many private breeders are also engaged in the breeding and sale of stud pigs.

Readers are reminded that a cross in the prescribed square on the first page of this "Journal" is an indication that their Subscription —one shilling—for the current year is now due. The "Journal" is free to farmers and the shilling is merely to cover the cost of postage for twelve months. If your copy is marked with a cross please renew your registration now. Fill in the order form on another page of this issue and mail it immediately, with postage stamps or postal note for one shilling, to the Under Secretary, Department of Agriculture and Stock, Brisbane.

WHEAT CROP COMPETITION—SEASON 1928.

REPORT OF THE DIRECTOR OF AGRICULTURE, MR. H. C. QUODLING.

Twenty-six crops were entered against fifty-one in last year's competition; fifteen and eleven entries being received from the Toowoomba and Warwick districts respectively. Six of last year's entrants competed again, including two prize winners, but the latter were unsuccessful on the present occasion. A 50 per cent. reduction in entries in such a short period may or may not have much significance, and might be attributable, in part, to a late pronouncement being made respecting the holding of the competition, and to the influence exercised generally on crops by the incidence of the dry weather. If the educational value of such competitions is to be the primary reason for holding them, good grounds exist for the earlier lodgment of entries immediately the planting season is concluded; otherwise, there is a likelihood of a repetition of crops being entered, as many were this year when actually ripe.

As success in any business undertaking is measured by the resultant £ s. d., it follows that the conditions laid down as a basis for a wheat crop competition should deal with fundamentals governing that success. Good cultivation and early and intelligently planned cropping arrangements come naturally within this category.

The opinion is expressed that if a competition is to be held in 1929, the earliest possible pronouncement respecting its conditions should be made, a small quota of the entrance fee might be lodged at time of nomination and the balance at a date to be decided upon.

In submitting the report at the conclusion of last year's competition and referring specifically to the points for "apparent yield," it was suggested at the time that one point might be allotted for each of the first twenty-four bushels and half a point for every subsequent bushel; however, it was decided by the promoters of this year's competition that half a point was to be awarded for every bushel, under this particular heading.

If an analysis of the results of this year's competition were made on the former mentioned basis, it would have had a marked effect on the present results. As far as your judges are concerned they still subscribe to the opinion that by allowing the general scale of points to remain as at present, and adopting last year's suggestion (one point for each bushel of the first twenty-four bushels and half a point for each additional bushel), it would have an effect in assisting to promote the growth of prolific commercial varieties under conditions calculated to encourage the production of wheat on a sound basis.

Another matter having a bearing on future crop competitions was the suggestion made on behalf of growers who cultivate large areas of wheat that two competitions should be run, one for 20 acres as at present and another for 100-acre fields. Our opinion is that large scale operations are deserving of every possible support.

Turning again to this year's competition it will be noted from the schedule of points awarded when judging was carried out, that high yields were anticipated. This fact clearly indicates how important it is for growers seeking greater stability and success in their business to adopt early and thorough methods of cultivation, as these were found to invariably synchronise with high yields. Close observation clearly showed also that capacity to yield was undoubtedly dependent upon the wheat in the early prepared fields having reserve supplies of sub-soil moisture to draw upon during several weeks of dry weather in August and September. Where this moisture was unavailable on late prepared and late sown fields, crop yields suffered accordingly.

Plate 49.—Bending Low with its Weight of Grain.

With this Crop of "Pusa," Mr. W. Sprott, of Pilton, won the 1st and Champion Prizes in the Competition, also first place in the Southern Downs Division

Plate 50.—Mr J. Pauli's Crop of "Clarendon," at Back Plains, Clifton, was First in the Eastern Downs Division

The Director of Agriculture, Mr. H. C. Quodling, is the figure in the foreground

"Of the world's great work he has done his share
Who has garnered a crop of wheat."

PLATE 51.—MR. E. C. KREIG'S EXCELLENT CROP OF THE "DUKE OF YORK" VARIETY, AT BROOKSTEAD, WAS AWARDED SECOND PLACE IN THE EASTERN DOWNS DIVISION.

PLATE 52.—THIS CROP OF "WATCHMAN," GROWN BY MR. R. S. YOUNG ON HIS FARM AT UPPER FREESTONE, WAS AWARDED SECOND PLACE IN THE SOUTHERN DOWNS DIVISION.

"A field of gold, shadowed by green wooded hills."

Plate 53.—Messrs. J. H. and R. M. Anderson's crop of "Pusa," at Southbrook, Darling Downs, gained Third Place in the Eastern Downs Division.

" . . . After all the toil and heat,
He's paid in more than silver who has grown one field of wheat."

Plate 54.—Mr. F. J. Armstrong's Crop of "Pusa," on his Farm at Pilton, was given Third Prize for the Southern Downs Division.

"Green and amber and gold it grows
When the sun sinks late in the West."

WHEAT CROP COMPETITION, 1928—SOUTHERN DOWNS DIVISION.
EASTERN DOWNS HORTICULTURAL AND AGRICULTURAL ASSOCIATION, WARWICK.

Name of Competitor.	Variety.	Apparent Yield.	Points Awarded.							Place in Competition.
			Apparent Yield.	Trueness to Type and Purity.	Freedom from Disease.	Evenness of Crop.	Condition.	Cleanliness.	Total Points Awarded.	
		Bus.	Half point per Bus.	Max. 20.	Max. 30.	Max. 20.	Max. 10.	Max. 20.		
W. Sprott, Pilton	Pusa	46	23	17·0	27·5	17·5	9·0	18·0	112·0	1
R. S. Young, Upper Freestone	Watchman	38	19	19·0	28·0	18·0	7·0	17·0	108·0	2
F. J. Armstrong, Pilton	Pusa	42	21	17·0	28·0	16·0	8·0	17·0	107·0	3
C. W. Free, Headington Hill, Clifton	Pusa	40	20	17·0	28·0	17·0	8·0	16·0	106·0	4
Robt. Reed, Willowvale, Warwick	Novo	40	20	17·5	27·5	17·0	7·0	16·5	105·5	5
Christensen Bros., Freestone	Three Seas	40	20	16·0	28·0	17·5	8·0	15·0	104·5	6
M. S. Kelly, Junabee	Florence	36	18	14·0	29·0	17·0	8·0	16·5	102·5	7
C. W. Free, Headington Hill, Clifton	Clarendon	34	17	17·0	28·5	16·0	7·5	16·0	102·0	8
W. P. Canning, Yangan	Waratah	36	18	17·0	26·0	17·0	7·5	16·0	101·5	9
W. Crichton, Mount Juliet, Warwick	Gluyas	38	19	16·0	27·5	15·5	7·5	15·0	100·5	10
W. Tucker, Willowvale	Clarendon	40	20	14·5	27·0	16·0	7·0	14·0	98·5	11
C. Nielsen, Yangan	Novo	36	18	14·0	25·5	17·0	5·0	12·0	91·5	12

WHEAT CROP COMPETITION, 1928—EASTERN DOWNS DIVISION.
ROYAL AGRICULTURAL SOCIETY, TOOWOOMBA.

Name of Competitor.	Variety.	Apparent Yield.	Points Awarded.							Place in Competition.
			Apparent Yield.	Trueness to Type and Purity.	Freedom from Disease	Evenness of Crop.	Condition.	Cleanliness.	Total Points Awarded.	
		Bus.	Half point per Bus.	Max. 20.	Max. 30.	Max. 20.	Max. 10.	Max. 20.		
J. Pauli, Clifton	Clarendon	36	18·0	16·5	29·0	19·0	8·5	19·0	110·0	1
E. C. Kreig, Brookstead	Duke of York ..	34	17·0	20·0	29·0	17·0	8·0	18·0	109·0	2
J. H. and R. M. Anderson, Southbrook ..	Pusa	38	19·0	17·0	27·0	18·0	8·0	18·0	107·0	3
J. Ritson and Sons, Clifton	Pusa	39	19·5	16·5	28·0	17·0	7·0	17·0	105·0	4
W. McLellan, junr., Nobby	Warren	36	18·0	15·5	26·0	17·0	8·0	18·0	102·5	5
J. W. Joppich, North Branch, Pittsworth ..	Currawa	33	16·5	15·5	26·0	18·0	7·0	18·0	101·0	6
J. Ritson and Sons, Clifton (2)	Florence	32	16·0	17·0	26·0	17·0	7·5	17·0	100·5	7
Ziesemer Bros., Bongeen	Florence	25	12·5	17·0	27·0	17·5	7·0	19·0	100·0	8
J. Ritson and Sons, Clifton (1)	Florence	32	16·0	16·0	28·0	16·0	8·0	17·5	100·0	8
Ziesemer Bros., Bongeen	Pusa	30	15·0	18·0	22·0	17·5	7·5	19·0	99·0	9
J. Flegler, junr., Irongate, Pittsworth ..	Florence	22	11·0	17·5	28·0	17·0	7·0	18·0	98·5	10
A. F. Gilkeson, Kingsthorpe	Clarendon	27	13·5	16·5	27·5	16·0	7·0	18·0	98·5	10
G. J. Will, Kinkora, Pittsworth	Clarendon	27	13·5	15·0	27·5	15·5	7·5	17·5	96·5	11
G. J. Will, Kinkora, Pittsworth	Currawa	30	15·0	14·5	26·0	15·5	6·5	18·0	95·5	12

PLATE 55.—MR ROBERT REED'S FIELD OF "NOVO" WHEAT ON HIS FARM AT WILLOWVALE, DARLING DOWNS.

"Realisin' he was wealthy in what makes a life worth while."

PLATE 56.—A FINE CROP OF "THREE SEAS" WHEAT ON MESSRS. CHRISTENSEN BROS. FARM, FREESTONE, DARLING DOWNS.

"When the settin' sun is gettin' low above the western hills,
When the creepin' shadows deepen, and a peace the whole world fills."

Plate 57.—"Waratah" Wheat on Mr. W. P. Canning's Farm, Yangan, Darling Downs.

"Wheat, Wheat, Wheat! When it comes my turn to meet
Death the Reaper, an' the Keeper of the Judgment Book I greet,
Then I'll face 'em sort o' calmer with the solace of the farmer
That he's fed a million brothers with his Wheat, Wheat, Wheat."

Plate 58.—Mr. J. Joppich's Fine Crop of "Currawa," on Roseneath Farm, North Branch, Pittsworth, Darling Downs.

"Mountain or river or shining star,
There's never a sight can beat—
Away to the skyline stretching far—
A sea of the ripening wheat."

WHEAT CROP COMPETITION, 1928.

SHOWING POSITION IN ORDER OF MERIT OF COMPETITORS FROM WARWICK AND TOOWOOMBA DISTRICTS.

Name of Competitor.	Variety.	District Competition.	Apparent Yield.	Apparent Yield.	Trueness to Type and Purity.	Freedom from Disease.	Evenness of Crop.	Condition.	Cleanliness.	Total Points Awarded.	Place in Competition.
			Bus.	Half-point per Bus.	20	30	20	10	20		
W. Sprott, Pilton	Pusa ..	Warwick ..	46	23·0	17·0	27·5	17·5	9·0	18·0	112·0	*1
J. Pauli, Clifton	Clarendon ..	Toowoomba	36	18·0	16·5	29·0	19·0	8·5	19·0	110·0	2
E. C. Kreig, Brookstead	Duke of York	Toowoomba ..	34	17·0	20·0	29·0	17·0	8·0	18·0	109·0	3
R. S. Young, Upper Freestone ..	Watchman ..	Warwick ..	38	19·0	19·0	28·0	18·0	7·0	17·0	108·0	4
J. H. and R. M. Anderson, Southbrook	Pusa ..	Toowoomba ..	38	19·0	17·0	27·0	18·0	8·0	18·0	107·0	5
F. J. Armstrong, Pilton	Pusa ..	Warwick ..	42	21·0	17·0	28·0	16·0	8·0	17·0	107·0	5
C. W. Free, Headington Hill, Clifton	Pusa ..	Warwick ..	40	20·0	17·0	28·0	17·0	8·0	16·0	106·0	6
Robt. Reed, Willowvale, Warwick	Novo ..	Warwick ..	40	20·0	17·5	27·5	17·0	7·0	16·5	105·5	7
J. Ritson and Sons, Clifton ..	Pusa ..	Toowoomba ..	39	19·5	16·5	28·0	17·0	7·0	17·0	105·0	8
Christensen Bros., Freestone ..	Three Seas ..	Warwick ..	40	20·0	16·0	28·0	17·5	8·0	15·0	104·5	9
M. E. Kelly, Junabee	Florence ..	Warwick ..	36	18·0	14·0	29·0	17·0	8·0	16·5	102·5	10
W. McLellan, junr., Nobby ..	Warren ..	Toowoomba ..	36	18·0	15·5	26·0	17·0	8·0	18·0	102·5	10
C. W. Free, Headington Hill, Clifton	Clarendon ..	Warwick ..	34	17·0	17·0	28·5	16·0	7·5	16·0	102·0	11
W. P. Canning, Yangan	Waratah ..	Warwick ..	36	18·0	17·0	26·0	17·0	7·5	16·0	101·5	12
J. W. Joppich, North Branch, Pittsworth	Currawa ..	Toowoomba ..	33	16·5	15·5	26·0	18·0	7·0	18·0	101·0	13
W. Crichton, Mount Juliet, Warwick	Gluyas ..	Warwick ..	38	19·0	16·0	27·5	15·5	7·5	15·0	100·5	14
J. Ritson and Sons, Clifton (2) ..	Florence ..	Toowoomba ..	32	16·0	17·0	26 0	17·0	7·5	17·0	100·5	14
Ziesemer Bros., Bongeen	Florence ..	Toowoomba ..	25	12·5	17·0	27 0	17·5	7·0	19·0	100·0	15
J. Ritson and Sons, Clifton (1) ..	Florence ..	Toowoomba ..	32	16·0	16·0	28·0	16·0	8·0	17·5	100·0	15
Ziesemer Bros., Bongeen	Pusa ..	Toowoomba ..	30	15·0	18·0	22·0	17·5	7·5	19·0	99·0	16
J. Flegler, junr., Irongate, Pittsworth	Florence ..	Toowoomba ..	22	11·0	17·5	28·0	17·0	7·0	18·0	98·5	17
W. Tucker, Willowvale	Clarendon ..	Warwick ..	40	20·0	14·5	27·0	16·0	7·0	14·0	98·5	17
A. F. Gilkeson, Kingsthorpe ..	Clarendon ..	Toowoomba ..	27	13·5	16·5	27·5	16·0	7·0	18·0	98·5	17
G. J. Will, Kinkora, Pittsworth ..	Clarendon ..	Toowoomba	27	13·5	15·0	27·5	15·5	7·5	17·5	96·5	18
G. J. Will, Kinkora, Pittsworth ..	Currawa ..	Toowoomba ..	30	15·0	14·5	26·0	15·5	6·5	18·0	95·5	19
C. Nielsen, Yangan	Novo ..	Warwick ..	36	18·0	14·0	25·5	17·0	5·0	12·0	91·5	20

* First and Champion.

Plate 59.—Messrs. Ziesemer Bros. field of "Florence," at Bongeen Darling Downs.

"And the breeze sweeps o'er the rippling rows,
Where the quail and skylark nest."

Plate 60.—Mr. G. J. Will's fine crop of "Currawa" Wheat at Kinkora, Darling Downs.

" . . . with a feelin' like content,
An' I feel like thankin' Heaven for a day in labour spent."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING DECEMBER, 1928 AND 1927, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.	No. of Years' Records.	Dec., 1928.	Dec., 1927.		Dec.	No. of Years' Records.	Dec., 1928.	Dec., 1927.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	7·77	27	6·50	7·76	Nambour	6·92	32	5·04	11·82
Cairns	8·79	46	3·75	3·38	Nanango	3·84	46	4·90	4·49
Cardwell	8·35	56	3·83	11·16	Rockhampton ...	4·82	41	4·36	9·14
Cooktown	6·96	52	2·07	6·68	Woodford	5·76	41	2·79	10·46
Herberton	5·70	41	6·58	4·94					
Ingham	6·94	36	8·78	6·00					
Innisfail	11·87	47	10·34	14·58					
Mossman	11·97	15	4·29	9·40					
Townsville	5·61	57	3·76	8·50					
					Darling Downs.				
					Dalby	3·22	58	3·09	2·94
Central Coast.					Emu Vale... ...	3·54	32	5·24	3·60
Ayr	3·97	41	4·13	9·63	Jimbour	3·20	40	4·28	3·65
Bowen	4·51	57	2·10	8·86	Miles	2·97	43	2·28	5·09
Charters Towers ..	3·54	46	3·82	3·94	Stanthorpe ...	3·52	55	4·94	2·71
Mackay	7·35	57	10·10	35·82	Toowoomba ...	4·35	56	5·91	5·92
Proserpine	8·31	25	10·10	11·75	Warwick	3·45	63	2·74	2·62
St. Lawrence ...	4·73	57	7·80	15·51					
					Maranoa.				
South Coast.					Roma	2·51	54	1·53	3·45
Biggenden	4·80	29	2·81	3·95					
Bundaberg	5·04	45	1·19	6·84					
Brisbane	4·94	77	2·56	5·58	*State Farms, &c.*				
Caboolture	5·27	41	3·88	7·19	Bungeworgorai ...	3·05	14	0	3·41
Childers	5·82	33	4·29	4·39	Gatton College ...	3·64	29	0	7·28
Crohamhurst ...	7·20	35	4·24	13·51	Gindie	3·04	29	2·58	7·41
Esk	4·58	41	9·64	7·96	Hermitage ...	3·03	22	0	3·41
Gayndah	4·18	57	3·28	6·42	Kairi	6·93	14	3·29	3·57
Gympie	6·14	58	4·01	9·17	Sugar Experiment Station, Mackay	8·93	31	8·65	36·59
Kilkivan	4·63	49	2·71	6·57	Warren	3·84	14	0	6·18
Maryborough ...	4·76	56	5·10	3·84					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for December this year, and for the same period of 1927, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Meteorologist.

SEED POTATOES.

The careful selection of a suitable class of seed potatoes is necessary where potatoes are grown commercially. The utilisation of an even type of seed as regards sprouting size and shape means a regular and even germination, and as like begets like it is to be expected (all conditions being favourable) that the resultant crop will also be even in character. Seed should be selected carefully. Whole seed of two ounces size is to be at all times preferred. Tubers should be free of all signs of disease, regular in shape and size, and should be well sprouted or "shot" before the planting period eventuates. In this connection sprouts should be hardened by exposure to light and should not exceed ½ of an inch in length. Sprouts in excess of this length are apt to be damaged in handling during the process of planting.

Where disease such as scale is suspected the usual formalin treatment prior to planting is to be recommended, using 1 pint of 40 per cent. formalin to 20 gallons of water and immersing therein tubers and bags for 1½ hours. Allow the tubers to dry under shade before planting. A slight discoloration of the sprouts if very tender may take place as the result of their coming in contact with the formalin solution, but the setback so obtained will be more than counterbalanced by the subsequent clean growth of the resultant plants.—A. E. GIBSON, Senior Instructor in Agriculture.

FARM TRACTORS.

PLACE OF THE VALVES IN THE CYCLE OF OPERATIONS.

By E. T. BROWN.*

As suggested in a previous article the timing of the valves is decided by the maker of the engine. He is guided by various factors, such as the size of the valve opening, the compression ratio of the engine, its horse-power, and the engine speed. It is, however, better that the tractor operator should understand exactly when the valves are caused to open and shut, so that after dismantling he may be in a position to retime the engine if necessary. Here it might be remarked that whenever the engine is taken down the timing wheels working from the engine crankshaft should be marked so that they may be returned in exactly the same position. It is not commonly realised, but a tractor engine is a very wasteful machine. Not more than about one-fifth of the energy stored in the fuel is available for actual work. It is, however, one of the least wasteful of all the prime movers. In tractor engine construction it is essential to make a number of compromises. For instance, heat implies power, but it is necessary to sacrifice a certain amount of heat—dissipated by means of the cooling water—owing to the fact that the metal employed for cylinder construction is a conductor of heat. Failing cooling, the pistons would "seize" in the cylinders owing to excessive expansion. A second case in point is valve timing. It is found necessary to make serious sacrifices to secure the most possible power.

Timing the Inlet Valve.

When discussing the cycle of operations of a tractor engine it is usual to say that the inlet valve opens when the piston is at the top of its compression stroke and that it closes at the bottom of the inlet stroke. This is almost correct in the case of a very low-speed engine; it is not practicable with a comparatively high-speed engine like that used for a tractor. The mixture of air and fuel vapour is carried from the carburettor to the combustion chamber by the induction pipe. The fuel vapour is only held in very unwilling suspension. If the induction pipe be too large, which implies a slower movement of the mixture, the fuel vapour tends to liquefy. It is only possible to have valves of a certain size, the size being governed by the cylinder bore. The normal speed of a tractor engine is about 1,000 revolutions a minute. With the largest induction pipe and valve in use it is impossible for the mixture to enter the combustion chamber as rapidly as the piston descends on its induction stroke. This means that if the inlet valve were to open exactly at "top dead centre" and close at "bottom dead centre" only a partial charge would enter. The power of the firing stroke depends upon the quantity of firing mixture in the chamber. To give the incoming charge an opportunity of entering the combustion chamber it is necessary to keep the inlet valve open for some time after the piston has passed "bottom dead centre." In the majority of tractor engines the inlet valve is timed to close about 30 degrees late—that is, when the piston has travelled one-sixth of its compression stroke. Even so, the combustion chamber is not completely charged, but it contains more mixture than if the inlet valve had closed at "bottom dead centre." Incidentally it may be mentioned that this valve does not open until about 10 degrees after "top dead centre" has been reached. The reason for this is explained later.

The Exhaust Valve.

Exactly the same state of affairs is found with the exhaust valve. The piston rises on its exhaust stroke at such a high speed that it is impossible for it to drive out the exhaust gases. These would be compressed to such an extent were the exhaust valve only to open at "bottom dead centre" that the speed of the engine would be materially reduced and efficiency would be lost. When the piston is three-quarters of the way through its firing stroke the contents of the combustion chamber registers a pressure of between 40 lb. and 50 lb. to the square inch. If the exhaust valve be opened at this time the pressure assists the expulsion of the inert gases, while more time is also allowed. Hence there is not the same degree of back pressure on the piston head. The exhaust valve, too, is closed from 5 degrees to 10 degrees past top dead centre, so that the combustion chamber may be entirely emptied of its contents. This is the reason for the late opening of the inlet valve. The latter opens at the moment the exhaust valve closes.

Timing the Valves.

When retiming the engine the marks on the flywheel should be noted. These marks show the exact position of the piston in No. 1 cylinder—that is, the cylinder nearest the radiator. All that is necessary is to see that the flywheel is in the correct position for the opening of the inlet valve when the camshaft should be rotated until the inlet valve in this cylinder is just on the point of being raised. If the exhaust

* In the "Farmer and Settler."

cams be on a separate camshaft the flywheel should be put in that position, which denotes the opening point of the exhaust valve when the camshaft may be set correctly.

Careful Attention to Minor Details.

Unless the sparking plugs be kept in good order it is immaterial whether the magneto be working efficiently and the wiring be all that is desirable; it is impossible to secure a good "fat" spark to explode or fire the mixture of air and fuel vapour. The plugs must be kept clean and the gap between the points must be correctly set. The lubricating oil, which works up from the base into the combustion chamber, tends to coat the points of the plugs with carbon, and in course of time the deposit becomes so great that the gap is completely bridged. This means that the current, instead of forming a spark, simply passes over the carbon bridge without exploding the mixture. From time to time the plugs should be taken out and the carbon deposit removed. If the plugs be of the detachable type—that is, can be taken to pieces—this is a simple enough task. If they be made in one piece, the points may be scraped with a blunt knife, or if they be very dirty they may be boiled in a strong soda solution. Another method of cleaning is to turn the plug upside down, fill the body with petrol, and set fire to it. This burns the deposit away rapidly. When the plugs have been cleaned the extent of the gap should be tested by means of a feeler gauge, which is usually supplied with the machine. The best results are obtained by having a gap of one thirty-second of an inch, but this varies a little with different makes.

Cracked Cylinder Jacket.

If the supply of cooling water be inadequate or the cooling system be dirty there is always a chance that the jackets surrounding the cylinders may become cracked. If the crack be a large one the only thing is to buy a new cylinder block in place of the damaged one. But, as a general rule, the crack is only a small one, in which case it is a simple matter to effect a repair. There are two ways in which a cracked water jacket can be successfully mended. When the crack is less than a thirty-second of an inch in width the "rust joint" method can be employed. To effect a repair the water should be drained from the system and the drain cock closed. A piece of putty or tallow is then placed over the crack, care being taken not to allow any to enter. The cooling system is then filled with a solution of salammoniac to a level slightly above the top of the crack. This is allowed to remain in for half an hour. At the end of this period the system is drained and the engine run for a few minutes to warm the jacket. The process must be repeated three or four times. This forms a "rust joint," which will last for many years. The strength of the solution should be 1 lb. of salammoniac to 1 gallon of water.

The Steel Cement Method.

If the crack be too wide to repair by the above method, it can be filled with steel cement. The paint should be scraped off to a distance of ½ inch all round the crack, and the edges bevelled off about ⅛ inch. Very great care must be exercised in doing this part of the job, as it is an easy matter to break the casing completely. A sharp chisel should be used for the purpose. The cement mixture is then forced into the crack—a putty knife serves the purpose admirably—until the crack is filled, when the cement should be smoothed and rounded off. It should then be allowed to harden for two or three days. The cement takes on the properties of the surrounding metal and a perfect joint is formed.

QUEENSLAND RAIN-FOREST TREES.

By W. D. FRANCIS, Assistant Government Botanist.

Probably because of its strikingly ornamental timber the Tulipwood is one of the most widely known of Australian rain-forest trees. Its alternating bands of dark and pale wood evidently attracted the attention of settlers in the early days of colonisation as the timber and its qualities have been known for a long time. The species is termed *Harpullia pendula* by botanists. The trees attain a height of about 80 feet and a stem diameter of about 2 feet. The stem is sometimes flanged at the base in large trees; it is often irregular and grooved or angular in cross section. The bark is grey and is shed in round or irregular long flakes. The trees usually have a very large amount of pale or yellowish sapwood which is strongly contrasted with the dark-brown heartwood. The wood is very heavy and finely grained. The trees are frequently seen in cultivation in Brisbane streets. In nature the species is found as far south as the Bellinger River, in New South Wales (J. H. Maiden), and up as far as the Mulgrave River in North Queensland. The wood is used for parts of the external framing of billiard tables, for walking-sticks, and small wooden articles in which its brilliant colour contrasts become effective. The accompanying photographs illustrate the species as it is represented in the field and herbarium.

Photo.: W. D. Francis.]

Plate 61.—Tulipwood (*Harpullia pendula*).

A tree growing among granite boulders in the Kin Kin rain forest.

Photo.: Dept. of Agriculture and Stock.]

PLATE 62.—TULIPWOOD (*Harpullia pendula*). (A) DRY FRUIT.

FRUITGROWING IN QUEENSLAND.

FIELD REPORT.

The following report on the prospects of the fruit industry in the North Coast district has been received by the Minister for Agriculture and Stock (Hon. W. Forgan Smith) from Mr. R. L. Prest, of the Fruit Branch:—

MAROOCHY.

Bananas will generally be light and not of the best quality, especially those grown on the poorer forest country, having suffered severely during the past dry periods.

Pines.—A good crop is to be expected and plants will have benefited by the present rains. It is expected that the size will be generally smaller, perhaps an advantage in the case of those produced on the heavier soils of the Blackall Range, which as a rule are on the large side.

Citrus.—Will generally be light but, where the trees are receiving attention and feeding, of fair quality. It is unfortunate that soil, climatic, and cultural methods are not all that could be desired in this district, which generally accounts for the low condition of citrus orchards and the quality of fruit.

GAYNDAH.

Citrus.—Crop is generally medium to light, but promises to be of excellent quality, citrus production at present being in its infancy. The alluvial flats on the banks of the Burnett are well situated for irrigation, and climatic conditions are favourable for the production of high-grade Beauty of Glen Retreat mandarins, lemons, and navels. About 50 acres of new orchards have been planted during the past twelve months. This district can be recommended for citrus growing, provided care is taken to select the right class of soil and varieties for planting. Suitable water is available for irrigation.

ROCKHAMPTON, BONDOOLA, AND YEPPOON.

Bananas.—Generally a medium to good crop of good quality fruit from the richer soils.

Pines.—A moderate to good crop where grown on suitable soils.

Citrus.—Generally light and of moderate quality, too many orchards being on uncongenial soil with climatic and cultural conditions not favourable for the production of first-grade fruits.

BYFIELD.

Bananas.—Will generally be good to very good, though a less tonnage may be expected than that of last year, which for the first six months of the year was approximately 360 tons of bananas, and over 200 tons of citrus fruits. The bananas harvested were from less than 200 acres of plantations. This slight falling-off of production may generally be put down to the past dry condition which prevailed in this district, and to the increase in the damage done by banana beetle borer.

Citrus.—Generally light, but of fair quality considering the humidity under which they are grown. Citrus orchards have not received the attention needed for good orcharding, except in perhaps one case which is worthy of mention, Mr. C. H. Richter's orchard of 300 seedling mandarin and orange trees producing approximately 4,000 cases of marketable fruit, an example of the value of care and attention to the citrus orchard. The future prospects of this district appear good. There is one drawback to the district, that is the haulage of their produce over 28 miles of bad roads to the railhead at Yeppoon.

A HELPFUL AND INTERESTING JOURNAL.

A Nimbin (New South Wales) subscriber writes:—

"I must congratulate you on publishing such a splendid work. It is chock full of valuable and useful information, and it provides helpful and interesting reading not only for the farmer himself but for the rest of the family also."

GRADE STANDARDS FOR BANANAS.

MINISTERIAL STATEMENT.

The Minister for Agriculture and Stock (Mr. W. Forgan Smith) has informed the Press that for some time past he had been drawing the attention of the banana growers of Queensland to the necessity of placing their industry on a sound basis. In previous statements to the Press he had called attention to certain obvious weaknesses in organisation and methods, particularly with regard to marketing and the establishment of satisfactory grade standards. The importance of standard grading could not be stressed too much. Many industries at the present time were being injured because a few people in those industries failed to do the right thing, and because of such neglect injury was inflicted on others who conformed to the prescribed conditions and standards. It was necessary to do something further in the direction of providing that fruit of suitable quality only should be exported. The necessity for action along those lines had been accentuated in view of the complaints that had frequently reached here concerning the quality of Queensland bananas as supplied to the Southern markets. Unfortunately, investigation had shown that a proportion of the fruit so marketed justified some of those complaints. Regulations had been drafted under "*The Fruit and Vegetables Act of* 1927" for the purpose of providing grade standards for Cavendish bananas, the proposed grades being as under:—

Cased bananas shall be divided into three grades—"Choice," "Standard," or "Plain."

"Choice" shall mean sound fruit free from blemish, and having a minimum length of 8 inches and minimum circumference of 4¾ inches.

"Standard" shall mean sound fruit free from blemish, and having a minimum length of 6½ inches and minimum circumference of 4½ inches.

"Plain" shall mean sound fruit having a minimum length of 5½ inches and a minimum circumference of 4 inches.

Note.—All measurements for length are to be taken on the outside of the curve, from the junction of the fruit at the stem and to the apex of the fruit.

The Minister added that it was anticipated that these standards would be operative on and after the 19th January, and that it was the intention of the Department to vigorously enforce the grade requirements. The bulk of our banana-growers supplied bananas of good quality, but there were in the industry some growers who, through neglect or other causes, marketed bananas of unsatisfactory size and quality. It was necessary that these delinquents should not be allowed to destroy the banana industry of Queensland.

Mr. Forgan Smith is causing copies of the proposed grade standards for bananas to be sent to the Ministers of Agriculture in other States, and is suggesting, in cases where standards for bananas have not been established, that grade standards similar to those to operate in Queensland shall be provided. The Minister is aware, because of seasonal conditions, and owing to much suitable banana-growing country going out of production because of the invasion of the "Bunchy Top" disease, that there has been some difficulty in raising fruit of satisfactory quality; but, on the other hand, there is evidence that some growers have attempted to grow bananas on land that is unsuitable for the purpose, while there are other growers who have failed to give the banana plant the necessary cultural attention. Others, again, have cut the bananas at too early a stage and before the fruit has filled and developed sufficiently to enable it to mature properly. These, however, are factors that cannot be allowed to prejudice the industry, and possibly lead to the present protection against black-grown bananas being removed.

A very rigid inspection will be made at leading stations and other points in transit, and inspectors have been instructed to enforce the regulations in all cases where such action is found necessary.

It, therefore, behoves all growers to grade, market, and present their fruit in accordance with the requirements of the Act and Regulations, as otherwise action will be taken against them. The Minister looks to the banana-growers of the State generally to give their cordial support and assistance to the Department in its efforts in this direction. By those means the industry could be placed on an unassailable foundation, and much better returns accrue to the growers.

SHEEP AND WOOL.

By W. A. RUSSELL, M.L.A.*

No better service can be rendered to a valuable industry in a State like Queensland than that men familiar with the workings of the industry should seek to enlist for it the enlightened interest of their fellow citizens. This is what Mr. Russell is doing, and the subjoined notes from an address by him will be read with appreciation by those who realise the place that wool—one of our greatest assets—occupies in our economy.

ON a subject such as this only a sketchy outline can be given in the course of a short address. Confining my remarks to Queensland will narrow somewhat the scope of my observations.

Historical Sketch.

The first sheep were introduced to Queensland by the late Robert Martin Collins, of Mundulan, Beaudesert. This was in the latter end of 1842. The sheep were merinos, and as such, had eventually to be transferred to the Downs and Western Queensland. It is generally recognised that coastal areas are not suitable for merinos. By the turn of the wheel in the history of the State, Mundulan now carries sheep again. A first class Romney Marsh stud has been established there, and at recent sales top price for the series was realised for Mundulan wool. The Darling Downs has carried sheep since 1843, when Patrick Leslie and Frederick Bracker stocked land around Warwick with sheep. By 1861, from the few thousands introduced in the 40's, the numbers had grown to over 4,000,000 by importations from the South, and their natural increase. From there, sheep were distributed all over the State.

At first, and for many years afterwards, the short-stapled Saxony wools only were grown, and flocks were strengthened by constant importations of rams from Germany, Steiger and Gadegast blood being the chief types used. The sheep of those days cut an average of less than 4 lb. of greasy wool, spinning not less than 80's count, which is superfine. You will probably often see, in the daily Press, statements such as 64's tops are quoted at 50d., &c. It would be well to explain what "counts" means. It is based on the number of hanks of yarn of 560 yards length spun from a pound of clean wool. As an illustration, a 60's count means 60 multiplied by 560 (yards) equals 33,600 yards of yarn in a sixty top. This by the way.

The Saxony and Silesian wools have a black tip, and they contained what would be considered to-day excessive yolk and fat, the scoured yield seldom going above 45 per cent. of clean wool. They were light-boned, narrow, low-set animals, their fine wool denoting fine or delicate constitutions. This type has now disappeared from Queensland, and it may be interesting to show why the short fine wools on comparatively small sheep have been replaced by the long, medium to fine wools grown on a big body with a strong constitution. It is true that a limited quantity of short superfine wool is still shorn in Queensland, but it comes from old ewes, that when young grew fine combing wool, and which had, through age, lost its length and strength of fibre.

The Wanganella Strain.

The improvement in weight of fleece is double now—7 lb. per head on an average, and was brought about by the introduction of the Wanganella type. The Wanganella type, called abroad the "Australian Merino," was founded by Messrs. Peppin Brothers, in 1859, when 100 ewes of nearly pure Rambouillet blood were brought from Victoria to Wanganella, in the Riverina. By the greatest of good fortune, a pure bred Rambouillet ram, called "Emperor," had been brought to Sydney. This ram was acquired by the Peppin Brothers, and he "nicked" wonderfully well with the ewes on Wanganella. From him are descended most of the splendid sheep in New South Wales and Queensland. A further addition to the flock was made when two pure Rambouillets were imported from America. These were sons of "Old Grimes," a son of "Golden Drop"—a ram for which its owners, Messrs. Hammond Brothers, of New York State, refused 25,000 dollars, or about

*In an address delivered before the Kurilpa Progress Association.

£5,000. These two rams also "nicked" splendidly with the progeny of "Emperor." There has been no outcross (fresh blood) introduced into the flock for nearly sixty years. The Rambouillets are French merinos bred from Spanish sheep stolen by Napoleon Bonaparte during the conquest of Spain. This Wanganella type, as I have said, is the Australian merino as distinguished from the Saxony types represented by the Tasmanian, Mudgee, and Western Victorian types. A stud has been formed in Queensland at Victoria Downs, Morven, and at the annual sheep sales may be seen splendid examples of the Wanganellas. They are big plain-bodied sheep, carrying a fleece weighing on an average over 24 lb. of greasy wool. Note the remarkable difference between the sheep of 100 years ago—the fleeces of which averaged 2½ lb. of wool—and those of the present day.

A good flock of merino sheep, ewes, and wethers will average to-day over 10 lb. of wool (greasy). The quality is medium, that is, from 64's to 66's count. Approximately the wools of Queensland are classed as "strong," "medium," and "fine." Strong means 60's to 64's count, medium 64's to 70's count, and fine 70's to 80's count; 80's and upwards is superfine, and there is little of it in this State. What the development of the merino has meant to Australia is in itself an absorbing story. It is sufficient for the moment to say that 60 per cent. of our exports are, in values, represented by the merino sheep's wool, sheepskins, &c., and, incidentally, 34½ per cent. of the income tax assessed in Queensland is paid by woolgrowers.

The Fat Lamb Trade.

There is another aspect of the sheep and wool industry in Queensland, and that is the establishment of a fat mutton and fat lamb export business. Generally speaking, pure merinos are not favoured abroad as mutton carcases.

In most countries, and in some States of the Commonwealth where farming predominates over the pastoral business, sheep are looked upon as a tool of the farm. Sheep are scavengers in agriculture—that is, they eat anything in the vegetable family—even weeds. They are, besides, profitable not only for their wool, but for their flesh. They are easily handled, requiring far less attention than any of the other domesticated animals. The welfare of the sheep farmers of New Zealand is dependent upon their fat lamb and fat mutton export trade. Merinos are not used there excepting as one component of the crossbreds. Queensland is essentially a merino State, only 4 per cent. of her flocks being of British breeds or their crosses, yet our fat lambs can be, and have been bred quite as good as any New Zealand sheep. The precarious rainfall west of the Dividing Range, however, precludes the establishment of a fat lamb or fat mutton trade as a permanent business on a large scale. On the coastal areas there are much better conditions for sheep, for the rainfall is, at least, quite as good as that of New Zealand, with the added advantage of no winter as that season is known there.

In regard to the fleeces shorn from crossbreds, the price per lb. is at least 30 per cent. lower than for merinos, but the mutton and lamb more than make up in extra price and saleability. There is no reason why we should not build up an export trade for mutton and lamb here.

Sheep on the Coast.

Lately, sheep have been depastured on coastal areas and it has been shown that every ewe will return in lamb and wool not less than 20s. per head per annum, if the right breeds are used. The time has come when increased price per acre of land must induce intenser cultivation. With more cultivation must come the keeping of sheep, even if used only as "scavengers," or effective "weed killers," and few farms will be without their small flocks. From small beginnings it is possible that a big export business may be evolved.

Queensland the Healthiest Stock Country in the World.

The chief difficulties in the way of profitably keeping sheep may be shortly stated:—The greatest is blowfly infestation. Owing to the prevailing dry conditions in our pastoral areas, flies have not been in evidence to any great extent for two or three years. With the advent of good seasons, however, the pest is sure to become troublesome again. In my experiments on my station at Dalmally we discovered a treatment which gives 90 per cent. protection for a period of from about ten to twelve weeks. That is further than any others elsewhere have got. Dogs, and drought, too, take their toll of the flocks. Queensland, however, is freer of sheep diseases than any other country in the world.

In the Wool Shed—A Tribute to Australian Workers.

Wool is shorn at a suitable time of the year, and sent to the coast to be sold at the periodical sales. To those who have never seen shearing, or wool being classed or sold, a short description of both phases of the great pastoral business may be interesting. After everything is got ready for the team of shearers who go from shed to shed, the ordinary station becomes an active scene of hard work. The harvest of the previous twelve months' work is about to be gathered. Sheep are being mustered in the paddocks, stores are laid in to provide food for the men in the shed, and on the appointed day the whistle blows for the start. The shearers dart into the pens where the "woolly" sheep are held, and picking the softest shearing animals, they carry them to the board. It is a bustling and interesting scene. The wool falls off the animal, before the machines, and presently the shorn sheep, white as snow, go down into the counting pens, and the shearer darts back for another one. To see a sheep shorn, one is reminded of the peeling of an orange. After the fleece is removed from the animal, the "picker-up" takes the fleece, and running along the board, throws it out just as if it were a small blanket. The wool rollers skirt off the different kinds of pieces and stained wool, and then, after throwing it in the sides, roll the fleece into a neat ball. The fleece then is placed in the appropriate bin. There are a number of these bins, each of which will contain a particular class of wool. Usually the classing is AAA., AA., A., Broken, 1st Pieces, 2nd Pieces, Stained Pieces, Bellies, and Locks. Sometimes, with some clips, there are clothing classes. Combing is wool that is suitable for the worsted trade. It is long enough to be fit for the combing machines. Clothing wools are used for the ordinary woollen trade. Combing causes the fibres of the wool to be laid parallel to each other, while with clothing wools, which are carded, the fibres are mixed up. Combing wools allow a much tighter spin to the yarn than clothing or carding wool. The latter are used for broadcloth, &c., and the main principle of carded wools is that after weaving they are felted by the application of moisture and heat. After the classer has placed the wool in its appropriate bin, the presser, when sufficient wool has accumulated, puts the particular quality into the boxes of the wool press. When filled, power is applied to squeeze the contained wool into about a third of its original size. The flaps are sewn on the top, and the bale is turned out. It is then branded with the name of the station or holding, its class, name, and number, and after being weighed, and its weight entered in the shed book, it is ready to be loaded on to the waiting wagon by which the clip is conveyed to the railhead for despatch to the sale centres at one or other of our sea ports. On arrival at the stores on the waterfront it is weighed and stacked away until the wool sales are due.

The Efficiency of our Marketing Methods—Australia's High Reputation.

The Australian methods of sale are practically perfect in efficiency, and are being copied over the whole world. Prior to the fixed date of sales, samples are extracted from the clip in store, representing a number of bales of each class. They are taken haphazardly from the bulk. The sample bales are placed, with probably a thousand others, on the well-lighted wool floors, and opened up, there to await inspection and valuation by buyers, who come from every civilised country. The importance to Queensland of the business may be judged when it is known that the sum of £1,300,000 sterling was paid for the wool sold during a recent sale. After the buyers have valued the wools, they assemble at the auction room in Parbury House in Eagle street. The sale room is a huge auditorium with rows of seats and desks rising in tiers back to the gallery where interested people, other than buyers, watch the proceedings. It is in the tiers that the buyers are seated with their catalogues marked before them. The auctioneer, with his assistants, is on a dias. It is marvellous to see the speed with which hundreds of thousands of pounds worth of wool is disposed of in one short afternoon. It is wonderful, too, to observe the certainty with which the auctioneer picks out the successive buyers from the groups of shouting and frantically gesticulating bidders. It is worth while studying the whole operation from the valuing floor to the sale room. The wool is then shipped to reach manufacturers in every corner of the civilised world.

The Australian wool market is looked upon abroad as being essentially honest. That is, the wools are, with very very rare exceptions, pressed honestly at the wool sheds, and sold honestly at the sales. We have every reason to be proud of our reputation in wool matters.

HOW TO TREAT FLYBLOWN SHEEP.

Individual sheep can often be caught and treated in the paddock, but with a serious infestation it may be necessary to yard the flock or run them into a suitable corner so that they may be examined thoroughly and none may be missed. Struck sheep may show maggots either (*a*) in wounds in the skin, or (*b*) in the wool only.

Where the Maggots are found.

In the former, maggots are usually found in the depth of the wound, and, provided the wound is an open one, one dressing is usually fatal to all maggots, but such a wound is liable to be restruck in a few days. Sheep so affected therefore require dressing as often as they are restruck. These wounds may have been caused by injury, such as shear cuts, crow "picks," &c., and have subsequently become invaded by flies with consequent deposition of maggots, or the wounds may have followed a striking of the wool by maggots. In other cases the wound is not an open one. It is deep, or the sides are under-run, pus and maggots being to a greater or lesser extent hidden from sight. Such wounds require careful and often repeated dressing.

Remove Struck Wool and Maggots.

If the dressing is applied merely over the wool and rubbed well in the smaller maggots are destroyed, but the larger ones may overcome the effects of the dressing and move to new grounds to carry on their parasitic existence. Also, if the wool is not removed it is sometimes difficult to gauge the area in which the maggots are working, and consequently some may be missed when rubbing in the dressing.

The affected sheep is caught and held in a convenient position while the wool around the affected area is shorn off close to the skin in such a way as to define completely the struck patch, and to leave a border of at least an inch of normal wool all the way round; all "daggy," matted, or soiled wool about the breech of the sheep should be cut away. This lessens considerably the chances of a strike on some other part of the sheep. The struck area may be traced from the discolouration of the wool by the exudate that is given out. The wool close to the struck patch generally has a moist, clammy appearance, and is lacking in the lustre of normal healthy wool.

It is now desirable to remove all maggots. This can be done by striking the area briskly with the flat side of the shears, when the majority will be shaken off. Generally a few remain on, particularly in the case of wrinkly sheep, when they burrow down into the wrinkles. If time permits every maggot should be removed, but this is not always possible, and the dressing must serve to destroy the few that are left.

How to Apply the Dressing.

The dressing can be carried conveniently in a bottle, from which it may be poured on to the struck area, to be rubbed well in with the blades of the shears. It is necessary to rub the dressing well into the wrinkles and around the edges of the area, as the maggots move quickly and seek to hide themselves in the hollows of the wrinkles and in the unshorn wool.

After the wool has come away from a struck area a scab often forms over the raw patch, and maggots are frequently found under this scab. It is useless in such a case merely to apply the dressing over the scab, as it does not reach the maggots underneath, and they thrive as though nothing had been done to check them. It may seem to be retarding healing to remove a scab to get at the maggots, but this action is necessary.

With a badly struck sheep one dressing may be insufficient to cure the extensive wounds, hence it is necessary to continue the treatment until the wound is completely healed. The wound is liable to be restruck as long as there is moisture on the surface. It may scab over and become dry on the surface, but if the scab becomes knocked off before healing has taken place underneath a restrike may follow.

What an Effective Dressing should Do.

To be effective, a dressing should have the following properties:—(1) It should destroy the maggots without injuring the sheep or the wool; (2) it should be soothing and healing to the wound; (3) it should adhere to the wool and the affected

area of skin; (4) it should be repellent to the fly and thus prevent restrikes for a reasonable time.

After dressing—unless it is a very severe case, when it may be penned or paddocked separately to facilitate further dressing—the sheep can be let go again amongst the flock. One dressing is sufficient in most cases for the treatment of a strike, provided, of course, that it has been detected before the effects have become severe, which can only be assured by careful and regular inspection of the flock at sufficiently close intervals. It is a good plan for the stockman to keep the dressing in a bottle tied to his saddle, so that it is available at all times.—A. and P. Notes, N.S.W. Dept. Ag.

THE CULT OF THE COLT.*

FIRST RIDES—TYING-UP.

(By "U 9 L.")

We have mounted the colt once, got off him again, and then we mount and dismount several times. You see, its all educational. The only thing I would impress upon you is to mount him slowly—climb on, struggle up, get on any old way at all so long as you get on. But, above everything else, be careful. Early impressions last longest, so some wise old fellow is once reported to have said, and if in your carelessness that colt douses you, then you have made a mess of things, and it is going to take a lot of work to erase that bad impression. Also I would ask of you to do all things in a natural manner. Try and let the little fellow know by your actions that it is quite the proper thing to which you are subjecting him, and that it is a natural process to finalise the education of every cultured horse. Some breakers even go further and do the off side as well. For my part, I could never see any force in that. It's running a risk which doesn't profit you or the colt commensurately with that risk. Nine out of ten men, myself included, are as awkward as a gin in boots when attempting the unusual. That off-side mount is never going to be used, and to do a thing which we may only effect clumsily and with infinite caution is not conducive to the colt's well being.

In the Saddle.

Before getting on the youngster finally it is well for us to take a persuader with us. The colt hasn't yet learned to carry a man, he doesn't know the rules of gee and whoa, and we want something which will prompt him to move. We want a thing which will frighten him without intimidating him, a thing he can feel without it hurting him, something which won't cut, will not bruise, and yet which is handy for us to use. The best thing of the lot, in my idea, is a length of garden hose—a piece about 2 feet long, or a shade longer. When you flap that on his ribs it doesn't hurt him, though he can feel it, and the resounding smack which comes from it is sufficient in volume to prompt the colt to go. Armed with it, we mount. The colt stands still, and you will notice as you swing on that uncertain swaying which comes from the horse. That, I think, is the little fellow learning to balance his load. He has never carried anything in his life before, and though he is bred to it he has to learn to balance before he can do anything else. We gather up the reins, seat ourselves comfortably in the saddle, and from the custom of long habit we give the reins a little shake and use the customary means to urge our mount to move. He does not! He hasn't the faintest idea what is wanted of him, and he stands and sways a little. When our heels hit him he might move forward sluggishly, not knowing what to do, and then the length of garden hose flops on his ribs.

This does something. The colt gives a bit of a bound, catches himself in the air, as it were, and steadies himself to balance his load. At that unwonted action the girths might pinch a bit, the saddle may be uncomfortable, and the colt decides to shift them. He knows only one way, that handed down a long line of ancestors as the proper means to shift anything—from a beast of prey to an unwanted rider—and he humps his back, lowers his head and tries to buck. A colt ridden the first time may buck. I use the word "may" to denote the mere possibility. Usually he cannot.

* From the "Pastoral Review" for September, 1928. Previous notes on this subject by the same interesting and well-informed writer were reprinted in the March, August, October (1928), and January (1929) Journals, from the February, April, May, and July numbers of the "Pastoral Review."

Before a horse can buck he has got to be able to balance his load. A colt ridden the first time may only do that to a very weak extent. There are exceptions, of course, but I'm not referring to odd cases here. As soon as he has given his little display, and provided you are still on top, of course, your first and most important job is to soothe him. Let the little fellow know that there's nothing to hurt him, coax him to do another stride or two, and on the completion of each little forward motion tell him with all the earnestness you possess that he is a little marvel, there never was another like him, and to keep going. After riding him round the yard you will dismount and impress upon him the wonder of his progress, then ride him round the yard several times, across it, and do a few figures of 8 before the gate is opened and you take him outside.

Accustom the Colt to His Load.

When taking the colt outside, if it is possible at all, it makes the job so much easier if you have a man mounted on the old coacher. That merely serves as an inducement to go and do likewise when the old horse is ridden away. If there is no coacher, it really doesn't matter to any great extent. You go on your own. Some colts, as soon as they leave the confines of the yard, might be inclined to think that freedom is again theirs and go, or try to go, bush. Others need urging to do anything at all. And then there are others which will only progress in a series of erratic bounces, which the uninitiated call bucking. It isn't. Bucking, proper bucking, is an art which takes time to acquire. In whatever way your youngster gets over the ground you should mix it with him mentally the whole time. Drastic measures in correction are foolish at this stage of the game, and the object of the first riding is merely to try and accustom the colt to his load, to allow him to gain a certain degree of confidence, and to get him to move freely if possible. But even thus early I would impress on you the matter of educating the colt's mouth. For the love of goodness don't hang to it as though it were a sheet anchor, or a mainstay of some sort. A colt's mouth is for his guidance only, and for such a purpose alone may it be used. Gauge if you can the degree of pull which he is exerting, and against it use enough, and only enough, counter strength to achieve your own purpose. Never put more than half an ounce more weight on the reins than is necessary. Handle a colt's mouth lightly, with judgment and sympathy, and you have a horse which is responsive to your lightest touch and merest wish. It is worth doing, and it can be done in a manner which is not irksome either to rider or to beast.

Make the First Journey a Short One.

About half an hour's riding is quite sufficient for a start. Above all else, we do not want to weary this youngster in any of his lessons. Of course, tales are told of horses which have been ridden up to 40 miles on the day they were first mounted. Such things may be possible with an aged colt, but I wouldn't give you threepence a dozen for that fellow afterwards. In common with almost all other animals, a horse has only one really big day, or event, in him. When you have drained that you've sapped his vitality. That is the case nine times out of ten. To ride a colt 40 miles on his breaking day is equal to a ride of 100 miles or more when he is a set worker. A number of horses may do a stage of that sort and yet be able to come again. And a number, even of the good ones, may only do one stupendous day, and for ever after they are at the limit with just ordinary work. That is not included in the work of breaking, and I throw it in for good measure and merely as my own opinion.

Educating the Colt.

When you let the colt go after his first ride you may, or you may not, increase his education. Whether you do, or whether you don't, I would ask you particularly to try and impress on that child horse that he has done a good day's work, and that you are proud of him, that he should be proud of himself, and that to-morrow and the next day he is going to improve all the time. The rest of his breaking is merely a repetition, given over and over again, *ad nauseam*, till the youngster gains ease and proficiency in his work. Particularly I would ask of you when unsaddling to drag the saddle and gear off. Don't snap it away as if it was something which would bite him, but draw it away slowly, letting the girths and leathers caress him as they slide over his back, and in every way try and avoid frightening him of anything. The surest way of allaying a young horse's fears, I have found, is to let him know by every action of your own that there is nothing of which he should be afraid. Above all else, don't let him think you are in any way frightened, for as sure as eggs you will find that a horse borrows from and adopts something of the character of his rider. An excitable man will have excitable horses, nervousness begets fear, a

casual don't-care-a-cuss man will have similar horses, and he who is of a slow mentality and stubborn should never inflict upon horses his personality. I'm lecturing a dickens of a lot, and doing little. Let's do something.

Strong Gear Needed

We will now proceed, ladies and gentlemen, to give a demonstration of how a horse is taught to tie up. (These definitions make bad grammar. Fancy ending a sentence with a preposition!) To tie up a horse (that's better) we want strong gear. In fact, there's a halter and shank kept for this purpose alone. We catch our colt, tell him our usual plausible tale of how we are not going to hurt him and what a good little boy he is, and lead him to the post where this lesson is learned. It's a stout post, well and truly sunk and rammed, and to a swivel on top of it we attach the shank of the halter. If we have not got such a post, then we'll have to do the next best thing and tie him to a rail in the yard. But a post out in the centre of the yard, free of all encumbrances, is the thing. When the colt bounds, as he is going to do, he's not likely to get his legs tangled in the rails. He is not able to buck into the fence or skin his forehead, and when he throws himself on the ground and sulks, lying there with half-shut eyes and groaning grunts, he cannot get his legs under the bottom rail of the yard, and skin or break them when he struggles to rise. However, apart from anything else, the main thing is a halter which will stand the strain, and a shank which won't break. This is a negative lesson we are giving now—a thing which cannot be done—and we do not want to upset our good work by the shank parting and making liars of us and a bad example for the horse.

If a colt will not pull back it is advisable to make him do so? To a very slight extent, sir. If he won't take a strain it is not necessary to throw a bag at his head. As you walk by flit some dust in his face with a sideways kick of your boot. That will do it, and the horse does not know you are doing it on purpose. Anyway, if he doesn't pull at once, he will later on. If there is no other way of making him take hold, let some horses run through the yard past him and out of the gate. That will make him pull, and he has got to do so to find he cannot get away. You must lift a little hair and skin in this exercise, so please keep that fat-kerosene mixture handy. And if a colt lies down and grunts and will not pull, what about it then? A spreader is the thing for a colt like that. Get a spreader, lift it and tap one, two, three. That will bring him to his senses. Hit the colt? No. Hit that rope. The jar of it running through will bring him to his feet with a run, and also with a colt that sits back and hangs in the one position without a struggle, the spreader on that taut rope will also let him know he's not playing the game according to Hoyle.

THE DINGO—A FEW HINTS ON TRAPPING THE PEST.

Any discussions as to the possibilities of future development in the pastoral industry are generally concerned with breeding problems or the improvement of pastures by top-dressing, &c., and at the bottom of all of these suggestions is the one idea—an increased return per acre. It is contended, however, that it would not be possible, even by adopting these progressive methods, to maintain the carrying capacity of our pastoral country at its present level if means were not taken to cope with such pests as the rabbit, blowfly, and dingo. Just how much these pests decrease the carrying capacity, and consequently the return per acre, it would be most difficult to estimate, but it is generally agreed that the amount is considerable. It is also an interesting fact that the more work done in regard to the improvement of pastures and flocks, the greater is the attraction in many directions for these pests.

Periodically in these columns we have dealt with different aspects of the blowfly and rabbit problems, and it is intended now to treat with the trapping of dingoes as a method of exterminating that pest.

TRAPPING

If trapping is practised on an extensive scale it would pay some owners to employ a professional trapper under somewhat the same conditions as those governing the employment of rabbit trappers, paying a bonus for scalps. A trapper can attend from 150 to 200 traps, and may have to cover the total distance of 150 to 200 miles. The following information is supplied to meet the needs of those who do not consider their holdings large enough or badly enough infested to warrant the employment of such trappers.

The Traps.—Traps may be obtained from most ironmongery stores. They are of different sizes, the type generally used weighing 8 lb., with a space of 8 inches square between the open jaws. The jaws are provided with teeth which should not be too sharp, otherwise the dog may have his leg amputated or, perhaps, his foot nipped off and become, although lame, extremely troublesome by reason of his sharpened wits. A trap should not be too sensitive, or it may be sprung by rabbits, &c. To test it, drop pieces of wood of different weights from a height of 2 feet on to the plate; the piece which just sets it off should weigh 2 oz., and if this is not so the trap should be adjusted. Always overhaul traps after they have been sprung, in case they should be damaged or wrenched in some way.

Location of Traps.—This depends solely on the particular class of country. Behind logs and stones, on old dry watercourses, unused roads, tracks, &c., in the vicinity of waterholes, clear patches in scrub, are all good places. It should be borne in mind that, although the dingo may seek his quarry by very crooked and roundabout tracks, he returns to his lair by the shortest route. Other traps may be set off the track near bushes, shrubs, &c.

Setting the Trap.—There is some diversity of opinion as to whether the dingo will approach a spot if he suspects that man has recently been there. This is probably only correct with the veterans who have learnt all that man can teach them about traps. The younger ones and less cunning members of the species are known to follow men at some distance along a path.

The spot having been selected, first dig a hole about the same size as the trap and sufficiently deep to have the plate about ¼ inch below the surface of the ground. Open the trap and place it in the hole, cover the jaws and plate with a piece of brown paper about 14 inches square. Do not use white paper, for should some of the soil blow away and the paper become exposed, dogs will become suspicious and avoid the spot. Now pack the earth firmly around the jaws and spring, and cover the whole with earth. Make the place appear as natural as possible by fanning the surface of the soil with a hat, also by avoiding leaving pieces of paper, &c., lying about. The proximity of the trap may be marked by a dead bush or some similar natural object.

Never fasten a trap to the ground, as the dog may be able to tear himself free. It is better to rely on tracking him. Some trappers prefer to place poison on the trap, as the dog often bites it in his endeavours to free himself. This, however, is a matter of personal opinion, both methods being worth a trial.

DECOYS.

Several decoys have proved successful. Dragging the punctured carcass of a sheep over the ground by tying it to the axle of a cart and eventually leaving the carcass on the road in the line of traps is a good method.

Remember that most dogs would rather attack live sheep than dead ones, so that the paddock should be emptied before setting the traps, not only for the reason stated above, but also on account of the risk of sheep being caught by the very means which aim at their protection.

Oil of rhodium and oil of aniseed are frequently used, being placed in the boots of the trappers.

A live slut in heat led along the line of traps is an excellent method.

The dung of domestic dogs is perhaps one of the best decoys. Use about a dozen pellets and place the traps about 18 inches to 2 feet away, so that when the dingo approaches the decoy he will place his foot on the correct spot.

Dogs' urine is sometimes used, but is not always easy to obtain, and has to be renewed frequently owing to evaporation.

A excellent idea is to place the traps along the outside of a dog-proof fence; this will catch dogs that run along the fence seeking a place of ingress. If dogs have discovered a hole in the fence set a trap in the hole before repairing.

Traps should be inspected once or twice a week. In setting beside waterholes or under water where the track crosses a creek, it is desirable to approach the spot selected from the opposite side, wading through the water and thus leaving no tracks. In this case be sure that the trap is well greased before setting.—A.P. Notes, N.S.W. Dept. Ag.

THE STANTHORPE DISTRICT.

The following report (8th January, 1929) on the prospects of the Fruit Industry in the Stanthorpe district has been received by the Minister for Agriculture and Stock, the Hon. W. Forgan Smith, from Mr. H. St. J. Pratt, the Departmental representative in that district:—

"Most of the stone fruit has been harvested at satisfactory prices; the crop has not been as heavy as last year, and all varieties matured at least a fortnight earlier. Very little fruit has been sent to the factory, and if only more growers would realise the necessity and advantage of thinning out the whole crop would have been absorbed by the fresh fruit market at good prices.

English plums—President, Pond's Seedling, Grand Duke—will be on the market within a few days. It is anticipated that the prices will be good.

The Apple Crop.

The apple crop is about 30 per cent. lighter than last year, and the large quantities of Southern cold stored apples have had a very serious effect on prices for early varieties.

There will be a heavy crop of Jonathans this year, but other varieties will be considerably lighter, and it is expected that the prices towards the end of January and the months of February and March will be so much in excess of last year's that nett returns will be equalled if not exceeded.

Grapes.

The grape crop promises to be very satisfactory. The weather conditions so far have been most suitable, and there is very little disease in evidence—a great improvement on last year.

The earlier varieties will be on the market in about ten days.

The fruit fly "Dacus Tryoni" has done but very little damage so far, and up to the present no complaints have been received from Brisbane in that direction—to what extent the district will be invaded by the species "Jarvisii" yet remains to be seen, but will be known within the next month.

Vegetables.

Vegetables play a very prominent part in practically every orchard, and this season have been very much more remunerative than last season.

Many growers have done, and are doing, well out of beans, cabbages, and carrots.

Tomatoes will be on the light side this season, and it is expected that the factory supplies will be small. It is becoming more difficult every year to grow tomatoes successfully, and this is to a great extent attributable to the haphazard, happy-go-lucky methods of raising the plants in the seed beds. They are nearly always sown far too thickly, with the result that the plants are very weak and more subject to the many ills tomatoes are liable to contract.

The district, on the whole, is on the upward grade—there is a far better tone, and a feeling of optimism and security is in the air.

Marketing.

More growers are alive to the necessity of finding their own markets and avoiding the sending of large quantities of fruit and vegetables to the Brisbane markets. Many growers, through using a little initiative, have been enabled to dispose of practically the whole of their output privately, eliminating Brisbane altogether, which has been very much to their advantage.

Though a large number of deserted orchards have during the last few months been destroyed, there is still a considerable number that should be dealt with similarly before next season. They produce a quantity of inferior fruit which reduces the price of the good fruit grown by the bona fide orchardist. The original owners were unable to make a living off them, and the present tenants who take them on for the season are in most cases bitterly disappointed as to the results.

I am of the opinion that Stanthorpe has at last turned the corner, as it were, has to a great extent thrown off the ill effects of the boom, and each succeeding year will, I believe, bring greater prosperity to the district.

Answers to Correspondents.

An Ailing Draught Horse.

A Chowey farmer writes:—Some time ago one of my draught horses became sick. I first noticed this when I drove him to water. He was very reluctant to go. He was very stiff, particularly in the hind quarters, and I had quite a job to turn him round. I drenched him with linseed oil and saltpetre, as on a previous occasion he had some urinary disorder, the urine being nearly black in colour. He would stay in the shed all day, only going out to graze at evening. I was feeding him on lucerne chaff, and he seemed to be getting right, as all stiffness left him. I then noticed a swelling on the under part of his chest, spreading back towards the belly, and at first was quite soft, afterwards being harder. He had difficulty in eating and drinking for a time, afterwards gradually becoming better, until he was quite normal. A cough, which ended in a sort of a whistle, developed, with a slight running from the nose. The droppings at this stage were of a very green colour, intermingled with a sort of a white slime. Later on the horse was to all outward appearance quite fit, except for the swelling under his chest. His hocks began to swell, also the thighs and buttocks and the shoulder muscles (or rather the muscle above the brand). He began to go off his feed and drink and appeared to be very full, would blow very much with the slightest exertion, and in, say, 200 yards would have to stop for a breather. I had a last look at him for the night and he was quite all right, nibbling round the shed, and in the morning he was dead, having to all appearance died without a struggle. If you could tell me what the trouble was I would appreciate it very much, as several neighbours were interested in the symptoms produced.''

Mr. Veterinary Surgeon McGown advises:—''The symptoms described in this case are very conflicting, as they point to various diseases, and it is therefore very difficult to form a correct diagnosis. However, from the information given it appears that this animal was suffering from some form of kidney trouble. Had the kidneys been sent to this Department for examination the answer would have been more satisfactory.''

BOTANY.

From the outward mail of the Government Botanist, Mr. Cyril White, F.L.S.

lathus or Net Fungus.

INQUIRER (Brisbane)—

The fungus is a species of Clathus or net fungus. The net fungi belong to the family Phalloideæ or stinkhorn fungi. The peculiarity of the members of this family is that the spores are borne in a wet, slimy, brown medium known as the gleba. In the net fungi the gleba is borne on the inner face of the meshes. Flies and other carrion-feeding insects visit the gleba and carry about the spores on their bodies, and thus the plant is spread.

Woods Identified.

J.S. (Woombye)—The three weeds are—

1. *Euthorbia pilulifera*, the asthma weed.—This plant is a very common weed in cultivation in Queensland, and attracted much attention some years ago as affording relief to persons suffering from asthma. The whole herb was dried and used as a tea about the same strength as ordinary tea. It seems to give relief, but the effects apparently wear off after a short time.
2. *Richardsonia scabia.*—This plant was ''boomed'' some years ago as a fodder under the name of Mexican clover. It does not, however, belong to the true clover family, and as far as our experience goes in Queensland seems to be left untouched by stock. It is rather a bad weed in cultivation, particularly in the pineapple plantations of the North Coast Line.
3. *Oxalis corymbosa*, a species of wood sorrel most commonly known in Queensland simply as Oxalis. It is a pernicious weed in gardens and does not seem to be particularly bad in large areas. It is a native of South America, and was probably introduced as an ornamental plant, as many of the genus are rather pretty and favourites in garden culture.

Wild Poppy—A Poisonous Plant.

J.W. (Cooroy)—

The plant commonly known as the Wild Poppy in Queensland is *Argemone mexicana*, variety *ochroleuca*, known by its rather silvery, prickly leaves and very pale yellow flowers. It is poisonous to stock, but is generally left untouched by them. The only cases we have on record of poisoning by it are some where the plant had been cut and allowed to wilt and then eaten by calves.

Tree Lucerne.

A.H. (Killara, Sydney)—

The true Tree Lucerne (*Medicago arborea*) seems to have died out entirely in Queensland. It has been introduced into various countries, but never seems to have taken on as a fodder crop. Professor N. E. Hansen, who was the first agricultural explorer appointed by the United States Department of Agriculture under their scheme of foreign exploration, visited various parts of Europe and Asia to especially collect seeds of species of *Medicago*, *Trifolium*, and allied plants and reported on *Medicago arborea* as follows:—

"*Medicago arborea* L. is the largest representative of the Medicago genus, attaining a height of upwards of 10 feet. It is a native of the Mediterranean region of Europe, Asia, and North Africa, and is the 'cytisus' mentioned by ancient Greek and Roman writers as an excellent forage plant. It is especially common on the islands of the Greek archipelago and in southern Italy. It is cultivated to a limited extent in various portions of its range, but, as it gets woody too quickly and is less productive, the ordinary lucerne is much more in favour. It is a favourite wild plant, as it furnishes rich feed for cattle, sheep, and goats. In old plants the wood is dark and hard like ebony, and its use for sabre handles, canes, and beads is recorded.

"The writer's personal observations in gathering wild seeds of this plant are confined to Mount Lycabetos in Athens, near Mars Hill, on which the apostle Paul preached to the Athenians, and to the cliffs near the outskirts of Naples, Italy, where the plants were found growing in the crevices of rocks, where they were inaccessible to any live stock. The plants seemed to flourish in the driest possible crevices in almost perpendicular cliffs, where, apparently, no water could get to them.

"*Medicago arborea* appears of value in hot, dry places where few other plants will live, but its greatest value is perhaps to be looked for from the standpoint of breeding. Some of its remarkable vigour could with advantage be imparted to the other Medicagos of more northern origin. This species has been tried in a limited way in Southern California as an ornamental plant, and north of its main range in Europe is considered only as an ornamental shrub, needing winter protection. The large, bright yellow flowers are abundantly produced."

It seems to have some virtue as a fodder for fairly dry, hot countries and should be a success in parts of Queensland and New South Wales, though we doubt if it has many advantages over a lot of the existing fodders we have here already.

Grass Identified (*Cenchrus australis*).

G.B. (Degilbo)—

Your specimen is *Cenchrus australis*, a hillside grass or scrub grass. It is also commonly known in Queensland by the ridiculous name of Scotchman's lice. It is a very coarse grass, and has little value as a fodder on this account. The prickly burrs often catch flies and other insects.

Bird of Paradise Flower.

J.D. (Mt. Tambourine)—

Your specimen is *Phitecolobium grandiflorum*, known on Tambourine and other places as Bird of Paradise Flower, Rainbow Flower, Tassel Flower, and other names. The genus Phitecolobium is one widely spread over the tropics, and several species occur in Queensland. The timber is often rather prettily streaked, and from this character is sometimes known as bacon wood.

A Common Weed (*Cleome aculeata*).

L.L. (Cairns)—

Your specimen is *Cleome aculeata,* a small plant of the caper family, a native of tropical America now a common naturalised weed in the East Indies, and introduced into Queensland within recent years probably from either Java or Singapore. Though the plant is fairly common, we do not know an English name applied to it. The plant so far has not manifested itself as a bad weed, and does not seem to call for any special method of eradication.

Nut Grass Eradication.

G.S. (Rosewood)—

The Director of Agriculture, Mr. H. C. Quodling, advises that no method of total eradication has so far been discovered for this pest. Some permanent crop, such as lucerne, will undoubtedly keep it temporarily suppressed, and other quick-growing crops such as, Japanese Millet, White Panicum, Giant Panicum, and Soudan Grass, are useful during the summer months, whilst Wheat (preferably Florence in your district), Skinless and Cape Barley, Algerian, Ruakura, or Sunrise Oats can be utilised during the winter months.

The insect referred to by you is probably that known as *Antonina australis* or Nut Grass coccid. This insect is frequently found feeding on the underground portions of Nut Grass, but in spite of its association with that plant it is not regarded favourably as a control factor. It is certainly incapable of killing out Nut Grass where normal cultivation operations are carried out, but it is claimed as being beneficial where the land in which Nut Grass is growing has not been disturbed for some time. As it is suspected that this insect may feed on the roots of other grasses, its general distribution should not be undertaken, at least for the present or until more is known about it.

Wild Millet.

F.L.H. (Memerambi, Nanango Line)—

Your specimen is *Panicum crus-galli,* commonly known as the wild millet. It is a grass with a wide distribution over the warmer parts of the world, and several forms occur in Queensland, the one you sent being most abundant as a weed in cultivation. The grass has some considerable value as a fodder and is generally regarded as the parent of such well-known fodders as Japanese Millet and White Panicum.

Curative Plants.

F.A. (Cairns)—

Your specimen is *Coelospermum reticulatum,* a shrub of the family Rubiaceæ, very common in Queensland, with a fairly wide range from Gladstone to the Cairns district, growing in rather dry country. Though common, we have not heard a local name for it or of its possessing any curative properties for diarrhœa.

A plant very common in parts of North Queensland, particularly in the Gulf country, is *Grewia polygona;* this plant has important value as a cure for diarrhœa, dysentery, &c., the leaves being either chewed or made into a decoction.

"Curled Dock."

M.R. (Warwick)—

In sending specimens of weeds such as Dock, it is better to send a piece of the seed-head and the leaf rather than the clean seeds. However, the seeds you send belong to *Rumex crispus,* the "Curled Dock," a very common plant, widely spread as a weed over practically the whole of the temperate regions of the world, and very common as a farm weed in Queensland. The plant is not known to possess any poisonous properties. Birds are very fond of the seeds, and the roots are used in medicine.

"Sovereign Wood."

J.L.T. (Atherton)—

Your specimen is *Terminalia sericocarpa*, in some places known as Sovereign Wood on account of the yellow timber; in other places known as Damson on account of the drupaceous fruit.

Trees Suitable for the Roma District.

H.J.S. (Roma)—

Write to Mr. G. B. Brooks, Department of Agriculture, Rockhampton, who, no doubt, will be able to supply you with a few seeds of the Algaroba. The trees likely to grow well at Mount Abundance are:—

Kurrajong (*Sterculia diversifolia*).

Celtis sinensis, commonly known in Queensland as Portuguese Elm. This tree does well in Western Queensland, and has some reputation as a fodder. We could, perhaps, send you a few seeds as we do not think they can be obtained from nurserymen.

Pepper Tree (*Schinas molle*).

Crow's Ash (*Flindersia australis*).

Moreton Bay Fig (*Ficus macrophilla*).

Citron-scented Gum (*Eucalyptus citriodora*).

Jacaranda (*Jacaranda mimosæfolia*).

Camphor laurel (*Cinnamomum camphora*).

Phytolacca or Bellasombra Tree (*Phytolacca dioica*).—This tree is a rapid grower and has some considerable value as a fodder tree. We do not think seeds can be obtained through the ordinary commercial channels, but you may obtain some from Mr. R. Dick, Purga, via Ipswich. He sells seeds, we understand, at 2s. a large packet.

Bunya Pine (*Araucaria bidwillii*).

Hoop Pine (*Araucaria Cunninghamii*).

Insignis Pine (*Pinus insignis*).

The Bottle Tree.

E.D.B. (Biggenden)—

1. Two species of Bottle Tree occur in Queensland, the Broad Leaf Bottle Tree (*Sterculia trichasiphon*) and the Narrow Leaf Bottle Tree (*Sterculia rupestrus*). The latter is the species that forms the perfect bottle-shape trunks, and it is confined to Queensland. The former is recorded from the Northern Territory as well as Queensland.
2. These are really the only two kinds of "bottle" tree. There is another species of Sterculia known in Queensland as the Scrub Bottle Tree (*Sterculia discolor*). It is common in the coastal scrubs of Southern Queensland, but the stems do not form a perfect bottle; they are simply stout and soft.
3. There is no cheap botanical handbook to enable you to identify Queensland wild flowers. The "Queensland Flora," by the late F. M. Bailey, price 30s. for a set of six volumes, is, perhaps, rather too big for your purpose. We would gladly name any specimens you care to send from time to time, and when perhaps you get to know the plants a bit better, you could obtain a copy of "The Queensland Flora" and use it to advantage.

Birdlime Tree.

C. (Cedar Creek, via Beenleigh)—

Your specimen is *Cordia myxa*, sometimes known as the Birdlime Tree owing to the sticky nature of the fruit pulp in the ripe fruits. It is a tree with a very wide distribution through North Australia to India, Ceylon, and as far west as Egypt, and is thought to have furnished the wood from which the Egyptians constructed their mummy cases. Its dried fruit is used in India as a medicine and is said to be purgative.

PIG RAISING.

From the outgoing mail of the Instructor in Pig Raising, Mr. E. J. Shelton.

Worms and Lice in Pigs.

G.W.B. (Umbiram)—

Your pigs are suffering from lice and, probably, worms as well. Thoroughly clean the pens, sheds, yards, and troughs, and let the sunlight get into every corner. Troughs should be cleaned frequently and regularly. Probably all the pigs are infested with hog lice, which are usually found behind the ears and under the body on the inside of the legs, where they lay their tiny white eggs. To kill lice, mix six parts of any waste oil, such as old motor oil or fish oil, with one part of kerosene, and apply the mixture by a cloth or brush to every part of each pig, including the insides of the ears. This treatment should be repeated four or five days after the first application, when more lice eggs will have hatched out. Another fairly satisfactory way of applying this mixture is by saturating a piece of bagging in the oil and kerosene and tying it around a solid post in the pig yard, and the pigs will rub themselves against it, but for immediate results it would be better to apply it by hand. Then, if practicable, spray all cracks and crevices about the pens with a weak solution of any disinfectant to kill any lice which may be lying about. To treat for worms a dose of turpentine and castor oil is most satisfactory. For a pig weighing 100 lb. live weight a dose would be half a teaspoonful of turpentine mixed with two tablespoonfuls of castor oil, and this dose should be mixed with a little warm skim milk and fed in the troughs first thing in the morning, the pigs having been starved since the previous morning's feed. The dose should be adjusted to suit the size of the pigs, and care should be taken to see that the pigs all get their share of the medicine in the milk. This dose of oil and turps should be repeated ten or twelve days later. Remember that medicinal treatment is of little use unless proper sanitation of the piggery is carried out. Burn up all the present bedding in the pens. A plentiful supply of greenstuff, preferably lucerne, is always beneficial for pigs of all ages.

OBITUARY.

HENRY CRAMER HAWTHORN.

On the 26th December last the death occurred at Warwick of Mr. H. C. Hawthorn, Inspector of Stock for the Warwick district. The late Mr. Hawthorn was sixty-two years of age, and, prior to entering the service, was very well known in pastoral circles on the Downs and elsewhere in the State. A native of Tasmania he was attracted to the mainland by the wider opportunities offering in the pastoral business. As a stockman his ability was quickly recognised, and he was appointed overseer on Glengallan Station, where he remained for a number of years. Later on he took over the management from time to time of several large Western properties, including Coreena Station, near Barcaldine. He afterwards held a responsible position at the Government Stock Experiment Station at Yeerongpilly for a considerable time. Later Mr. Hawthorn was appointed to the charge of the Stock Office at Killarney, where he remained for a number of years. He was subsequently appointed Stock Inspector at Barcaldine, and six years later was transferred to Warwick. Throughout most of the pastoral areas of the State, but particularly on the Downs and in the south-west, Mr. Hawthorn was greatly esteemed, and his sound knowledge of stock and pastoral experience were always at the disposal of farmers and graziers, by whom he was highly appreciated as a courteous and able officer. The late Mr. Hawthorn left a widow and grown-up family, to whom the Minister and officers of the Department of Agriculture and Stock have extended their deepest sympathy. The officers of the Stock Branch especially feel the double loss of capable colleagues in both Mr. Hawthorn and Mr. Smith.

GEORGE ANDREW SMITH.

The death of Mr. G. A. Smith, Inspector of Slaughter-houses, Rockhampton, on the 22nd of December last, as the result of a motor accident, was generally regretted, not only in the service, but among all sections of the community which he served so well. The late officer entered the public service in February, 1915, after having passed the prescribed examination, and was stationed from time to time at Toowoomba, Mackay, Gympie, Charters Towers, and Rockhampton. He was only forty-seven years of age at the time of his death, and left a widow and one child. Included among many expressions of sorrow and sympathy were messages from the Minister and officers of the Department of Agriculture and Stock.

EDWIN LYLE VIDLER.

The news of the tragic and lonely death of Mr. Edwin Lyle Vidler, as the result of an accident whilst climbing Mount Lindesay, a high peak of the Macpherson Range, on 26th December, was received with profound regret. The late Mr. Vidler was barely twenty-three years of age. He was educated at the Toowoomba Grammar School, and passed the Junior University examination with merit in science subjects. He joined the staff of the Department of Agriculture and Stock in July, 1924, and served in several branches, finally transferring to the chemical laboratory.

The deceased was a young man of striking individuality. He was not attracted by any organised sport, but found an outlet for his remarkable energy in photographic tours across open country and on precipitous heights. He was an intrepid and experienced mountain climber. In company with his friend, Mr. A. A. Salmon, a fellow-officer of this Department, and his companion on many adventurous excursions, he had climbed the chief peaks of the Glass Houses and other mountains, and, in one instance, out of sheer enthusiasm, he made a thrilling ascent of Crookneck in record time. At Easter, 1928, with Mr. Salmon, he climbed Mount Lindesay successfully from the eastern side. He left Brisbane on the 24th December to attempt the ascent by the difficult northern face alone, as he was unable to obtain a companion. The mountaineer's long-delayed return caused a party to set out on the 29th, and after an arduous and perilous search his body was found by his comrade, Mr. Salmon, at the foot of a crevice at a height of about 3,400 feet. It is presumed that he met his lonely death on 26th December by the loosening of a piece of rock upon which he depended, and falling, was killed instantaneously. Owing to the inaccessible nature of the country his remains were laid to rest near the spot where his friends found him.

All those who knew the deceased feel the loss of one whose mercurial temperament and bright personality were as a freshening breeze to more stolid natures. He was a very fine type of young man, studious and assiduous, a general favourite of the officers of the Department, and gave promise of becoming a valued officer and citizen. Had he lived longer his amazing vitality could not but have left its mark in the world.

Like so many other good Australians, the very glory of unconquerable youth, who set out for other and foreign fields to achieve a lofty purpose only to fall a willing sacrifice, he was buried where he fell. He rests in the shadow of the stark escarpment he assailed rising sheer above him, sheltered at its base by the bush he loved so well and with the birds he also loved to chant for him a never-ending requiem. The inexpressibly sad little ceremony of interment was performed early on New Year's Day. The police were assisted by two local gentlemen and three members of the search party. Constable Carter conducted a brief funeral service. At the head of the grave stands a neat cross made of hardwood by the dead man's cousin, Mr. Victor King. On the cross is a leaden plate carrying the name and age of the deceased, and the date of his death. A cairn of stones was built to definitely mark the spot.

On behalf of the Minister for Agriculture and Stock (Mr. W. Forgan Smith), the Under Secretary (Mr. E. Graham), the Assistant Under Secretary (Mr. R. Wilson), and other officers of the Department, a letter of condolence was sent to the father of the deceased, who is a resident of Bell.

General Notes.

Staff Changes and Appointments.

Mr. J. L. F. Foran, Stock Experiment Station, Townsville, has been seconded for duty to the Agricultural Chemical Laboratory, Brisbane.

Messrs. C. F. Andrews and T. Jones, of Tamaree, have been appointed Honorary Inspectors under and for the purposes of the Diseases in Plants Acts.

Government Representatives have been appointed and Members elected to the following Dingo Boards:—

Bungil Dingo Board—Mr. W. H. Thrupp, Roma, Government Representative; Messrs. C. Harms, P. Hoskin, G. F. Lalor, and H. H. McGowan, Members.

Mitchell West Dingo Board—The District Inspector of Stock, Longreach, Government Representative; Messrs. T. S. L. Armstrong, W. G. C. Avery, A. A. Moffat, and R. J. Willcocks, Members.

Leichhardt South Dingo Board—The District Inspector of Stock, Emerald, Government Representative; Messrs. M. M. Kavanagh, J. F. Le Feuvre, W. T. M. Penhallurick, and J. C. Wells, Members.

Messrs. A. H. Bauman and C. E. Holmes, of Charters Towers and Townsville, respectively, have been appointed Temporary Rangers under the Animals and Birds Acts, as from the 19th February, 1929.

Constables E. W. Conway and J. H. Gordon, of Gilliat and Dobbyn, respectively, have been appointed Inspectors of Slaughter-houses.

Appointments and elections made in connection with the undermentioned Dingo Boards:—

Bulloo Dingo Board—Mr. W. Williams, Thargomindah, Government Representative; Messrs. E. A. Sherwin, H. M. L. Hughes, H. L. Rutledge, and W. Carwardine, Members.

Belyando Dingo Board—The Inspector of Stock, Clermont, Government Representative; Messrs. W. R. Tindale, T. P. McCann, H. R. Goodwin, and W. E. Moller, Members.

Clermont Dingo Board—Mr. H. C. S. Griffin, Folfang, Clermont, Government Representative; Messrs. E. H. Templeton, K. Maclean, F. N. W. Cavaye, and W. J. Clements, Members.

Dr. H. W. Kerr, M.Sc., Ph.D., Sugar Soil Chemist, Bureau of Sugar Experiment Stations, has been appointed Acting Director of Sugar Experiment Stations as from 1st February, 1929, and during the absence of Mr. Easterby (Director) on leave.

Mr. S. Graham, of Upper Coomera, S.C. Line, has been appointed Honorary Inspector under the Diseases in Plants Acts.

Mr. J. T. Tod, of Goomburra, has been appointed Growers' Representative for District No. 4 on the Wheat Board until the 31st August, 1929.

The appointment of the Officer in Charge of Police at Mareeba as Acting Inspector of Stock has been cancelled as from 31st December, 1928.

Constable H. H. Taylor, of Kuridala, has been appointed Inspector of Slaughter-houses, as from 4th December, 1928.

Mr. H. V. King, of Toowoomba, has been appointed Government Representative on the Darling Downs Dingo Board, and Messrs. C. J. Allen, A. C. V. Bligh, C. Cooke, and E. R Rutledge have been elected Members of that Board.

Mr. L. A. MacKenzie, of Telson, Dingo, has been appointed Government Representative on the Leichhardt East Dingo Board, and Messrs. C. A. Barnard, C. Dobbs, J. W. McKenzie, and A. J. Salsbury have been elected Members of that Board.

Mr. G. Burton, of Cambooya, has been appointed Chairman of the Canary Seed Board until 28th February, 1930.

It has been approved that the lands of the canegrowers in the Mackay District who supplied cane to the Proserpine Central Sugar Mill during the 1928 season, be included in the Mackay Cane Pest Infected Area.

The following have been appointed Members of the Northern Pig Board:—Messrs. F. H. Hyde, Peeramon; C. A. Hough, Tolga; D. Johnston, Malanda; R. T. Croker, Malanda; R. Campbell, Peeramon; and L. R. Macgregor, Director of Marketing. They will hold office as from 1st January, 1929, to 31st December, 1929.

The position of Sales and Possessions Officer, Agricultural Bank, Brisbane, has been abolished.

The appointment of Mr. L. J. W. Taylor, as Inspector, Agricultural Bank, has been confirmed, as from 14th May, 1928.

The appointment of Mr. E. W. Weller, formerly of Birkdale, as Honorary Inspector, Diseases in Plants Acts, has been rescinded.

The following appointments have been made in the Bureau of Sugar Experiment Stations:—

Mr. A. F. Bell, B.Sc., Investigations Officer (Plant Pathology), to be Sugar Cane Pathologist;

Mr. N. Bennett, B.Sc., Investigations Officer (Sugar Mill Technology), to be Sugar Technologist and

Mr. H. W. Kerr, M.Sc., Investigations Officer (Soils), to be Sugar Soil Chemist;

as from 1st January, 1929.

Messrs. M. Flanagan (Brisbane), A. Black (Maryborough), F. A. Johnson (Maryborough), and W. L. Conn (Charters Towers), have been appointed Inspectors of Slaughter-houses, on probation.

Mr. D. A. Logan, Inspector of Stock, Mackay, has been appointed also Inspector under the Diseases in Plants Acts.

Mr. T. Tobin, of Round Mountain, Gatton, has again been appointed Government Representative on the West Moreton Dingo Board, and Messrs. H. H. Daniel, P. Dwyer, J. Logan, and J. H. Pitman have been elected Members of that Board.

Messrs. F. Tickle and M. B. Smith, of Mooloo, via Gympie, have been appointed Honorary Inspectors under the Diseases in Plants Acts.

Messrs. C. S. Clydesdale and J. J. McKeon, Assistant Instructors in Agriculture, have been appointed Instructors in Agriculture as from 1st July, 1928; Mr. L. A. Downey, Assistant Instructor in Pig Raising has been appointed Instructor in Pig Raising as from 1st July, 1928; and Messrs. A. Nagle and R. E. Haseler, Field Assistants, have been appointed Instructors in Cotton Culture as from 1st July, 1928.

Messrs. M. Coleman (Nobby), G. Burton (Cambooya), and L. R. Macgregor (Director of Marketing), have been appointed Members of the Canary Seed Board, as from 1st December, 1928, to 28th February, 1930.

The Officer in Charge of Police at Julia Creek has been appointed Acting Inspector of Stock.

The appointment of Mr. B. Dunbavand, as Inspector of Slaughter-houses, Ingham, has been confirmed, as from 1st June, 1928.

The Mining Warden and Police Magistrate, Charters Towers, has been appointed Government Representative on the Dalrymple Dingo Board, and the following have been elected Members of that Board:—Messrs. T. J. Salmon, A. Shepherd, E. E. D. White, and C. Woodburn.

Messrs. H. E. E. Larsen, E. P. Damm, A. O. Rohde, and S. Ukran, of Goomboorian, via Gympie, and Messrs. H. W. Baker, W. R. Perkins, and H. C. Poulsen, of Mooloolah, have been appointed Honorary Inspectors under the Diseases in Plants Acts.

The appointment of Mr. J. King, as Inspector, Agricultural Bank, has been confirmed, as from 15th May, 1928.

Mr. G. Bates, Assistant to Entomologist, has been appointed Assistant Entomologist, Bureau of Sugar Experiment Stations, as from 28th April, 1929.

The Officer in Charge of Police, Inglewood, has been appointed Acting Inspector of Stock.

It has been approved that Mr. R. Pusey, Inspector of Stock at Muttaburra, be transferred to the South Burnett Cleansing Area, and that Mr. T. Douglas be appointed Inspector of Stock. Mr. Douglas's headquarters will be at Kingaroy.

The services of Mr. H. J. Walker as Temporary Stock Assistant, Brisbane, will be continued from 1st January, 1929, to 30th June, 1929.

Mr. J. McLaren, Cunnamulla, has been appointed Government Representative on the Paroo Dingo Board, and Messrs. F. H. Cuzens, C. C. Campbell, A. Leeds, junr., and W. H. Young have been elected Members of that Board.

Mr. P. J. Short has been appointed Temporary Inspector of Slaughter-houses as from 4th February, 1929, to 20th March, 1929, and Mr. F. C. Shaw has been appointed Temporary Assistant Inspector of Stock and Slaughter-houses from 7th January, 1929, to 1st February, 1929.

Mr. R. B. Morwood, M.Sc., Assistant to Pathologist, has been appointed Assistant Pathologist as from 1st January, 1929.

Stock Foods Regulations.

In consequence of the amendment by Parliament during the recent session of "*The Stock Foods Act of* 1919," all Regulations under that Act have been revoked, and new Regulations approved.

Local Sugar Cane Prices Boards.

By Order in Council under the Regulation of Sugar Cane Prices Acts, members of all Local Sugar Cane Prices Boards have been removed, in order to prepare the way for the usual annual elections.

Grade Standards for Oranges and Mandarins.

In addition to the grade standards for cavendish bananas mentioned previously, the grade standards for oranges and mandarins, approved under the Fruit and Vegetables Act, have been amended. The new standards are as follow:—

Oranges and mandarins shall be sized into the following sizes—2¼ inches, 2½ inches, 2¾ inches, and "large":—

2¼ inches shall include fruit of a size of 2¼ inches or greater diameter, but less than 2½ inches;

2½ inches shall include fruit of a size of 2½ inches or greater diameter, but less than 2¾ inches;

2¾ inches shall include fruit of a size of 2¾ inches or greater diameter, but less than 3 inches;

"Large" shall include fruit of a size of 3 inches or over in diameter.

Wheat Board.

Notice has been issued of intention to constitute a Wheat Board under and for the purposes of "*The Primary Producers' Organisation and Marketing Acts,* 1926 *to* 1928" (instead of under the original Wheat Pool Acts), such Board to deal with wheat produced in Queensland during the seasons 1929-30, 1930-31, 1931-32, and 1932-33. The Board, if constituted, will consist of five elected representatives of growers and the Director of Marketing. One representative shall be elected from each of the five districts at present used for the existing Wheat Board. Persons eligible to vote on any referendum or election in connection with the proposed Board shall be persons who at any time during the twelve months immediately preceding the date of such referendum or election grew for sale wheat in any portion of Queensland.

Any petition for a poll to decide whether the proposed Board shall be constituted must be signed by at least fifty growers as above, and must reach the Minister on or before the twenty-seventh day of February, 1929. Persons who have grown or who have growing for sale wheat, since 1st January, 1928, are invited to send their names and addresses to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Border Restrictions.

The Minister for Agriculture and Stock, Mr. W. Forgan Smith, announced recently that his attention had been drawn to a paragraph headed "Border Restrictions Modified," which appeared in the morning papers of the 16th instant.

The matter referred to therein has been, and is at present the subject of correspondence between the Minister for Agriculture in New South Wales and himself. Mr. Smith mentioned that he had received intimation from Mr. Thorby, Minister for Agriculture, New South Wales, of the intention of the Minister to modify some of the conditions relative to stock proceeding from Queensland to New South Wales, but until such time as these matters had been gazetted they would not have the force of law, or be applicable to stock intended for the Southern States. He refrained from making an announcement of this matter until finality had been attained, for, in addition to the matters referred to in the Press references, there were further matters which he had brought under the notice of Mr. Thorby, and he anticipated receiving a reply from him upon these matters at an early date.

It is possible that Mr. Russell, M.L.A., had been advised of the communication that had been received by him from Mr. Thorby, but, of course, until the changes in the conditions were effected by "Gazette" notice, the existing regulations stood.

When the proposed alterations become law he will advise stock owners of the changed conditions governing the movement of stock over the Southern border.

Banana Weevil Borer Investigation Committee.

Following on the change in membership of the Banana Sectional Group, Regulation 127 under the Fruit Marketing Organisation Acts has been amended to provide that Messrs. F. J. Calvert, Mount Mellum, Landsborough, and C. E. Vines, Kin Kin, via Cooran, take the place of Messrs. Edwards and Warland, on the Investigation Committee formed in connection with the offering of a reward for an effective scheme of treatment for the control of the banana weevil borer.

Drainage of Irrigated Lands at Theodore.

"T.A.G." (Theodore, Dawson Valley) writes:—Going over the irrigated blocks on which cotton, maize, and lucerne is growing one finds dead patches due to waterlogging. This can only be remedied by better drainage. The level nature of the land and close texture of the soil makes surface drainage here impracticable. The next best thing to consider is underground tile drainage. Tile drainage, notwithstanding its high initial cost, will pay in greatly increased production. It is well known that tile-drained lands actually hold more water in suspension in the soil than undrained land, while at the same time keeping the soil in better physical condition. By tile draining, too, aeration of the soil is promoted appreciably.

Sugar Levies.

Regulations have been approved under the Primary Producers' Organisation and Marketing Acts providing for the making by the Inkerman and South Johnstone Central Sugar Mill Suppliers' Committees of levies on cane supplied to their respective mills during the season commencing 1st May, 1928, and ending on 28th February, 1929, such levies to be at the rate of 1d., in each instance, on every ton of cane supplied. Petitions for polls, signed by not less than 100 growers, in each instance, will be received by the Minister on or before 23rd January next. The amounts derived from the levies, if approved, will be used for defraying expenses incurred by the respective mill suppliers' committees in connection with the recent waterside workers' strike.

Levies by Mourilyan, Invicta, and Tully River Central Sugar Mill Suppliers' Committees.

Regulations have been approved under the Primary Producers' Organisation and Marketing Acts providing for the Mourilyan, Invicta, and Tully River Central Sugar Mill Suppliers' Committees to make levies on cane supplied to their respective mills during the season commencing 1st May, 1928, and ending on 28th February, 1929, at the rate of ½d. for Mourilyan and Invicta and 1d. for Tully River Central, on every ton of cane supplied. Petitions, signed by not less than eighty growers in each instance, will be received by the Under Secretary, on or before the 9th January, 1929, asking for a poll to be taken on the above levies respectively. The amounts of such levies are to be used for defraying expenses incurred by the respective mill suppliers' committees in connection with the recent waterside workers' strike.

Broom Millet Board.

Messrs. Hans Niemeyer, of Hatton Vale, Laidley, and Erich Max Schneider, of Binjour Plateau, Gayndah, are the only nominations received for the election of two growers' representatives for the Broom Millet Board. These two gentlemen are the sitting members of the Board, and they, with the Director of Marketing, Mr. L. R. Macgregor, will constitute the new Board for a further twelve months.

A notice was issued in the "Government Gazette" on the 8th of December last advising the intention of the Governor in Council to extend the operations of the Broom Millet Board until the 31st October, 1931. At the same time attention was drawn to the fact that a petition might be sent in up to the 9th of January, 1929, asking that a referendum be conducted to decide whether or not the Broom Millet Board should be so extended.

No such petition has been received, and consequently the Broom Millet Board will now remain in existence until the 31st October, 1931.

If you like the "Journal," kindly bring it under the notice of your neighbours who are not already subscribers. To farmers it is free and the annual charge of one shilling is merely to cover postage for the twelve months.

Flag Smut of Wheat.

A Proclamation has been issued declaring Flag Smut (*Urocystis tritici* Keern) to be a disease within the meaning of the Diseases in Plants Acts, and Regulations approved under those Acts provide that the occupier or owner of any land on which wheat plants are growing that are infested with or affected by Flag Smut, shall burn all stubble of such wheat plants immediately after harvesting. The penalty for a breach is £5 for the first offence, and not exceeding £20 for a second or subsequent offence.

The Pumpkin Beetle.

The Minister for Agriculture and Stock (Mr. Forgan Smith) commented recently on the fact that the pumpkin beetle is at present abnormally abundant in several districts in South-Eastern Queensland. This pest is capable of inflicting severe losses on pumpkins, rockmelons, watermelons, cucumbers, and vegetable marrows. The beetle is a distinctly marked little insect of an orange-yellow colour with two very conspicuous black blotches on each wing-cover. It measures about one-quarter of an inch in length, and feeds on both the foliage and flowers of attacked plants.

With respect to the control of this pest, the Chief Entomologist (Mr. Veitch) advises that a very considerable measure of success may be obtained by spraying or dusting with arsenate of lead. The spray should be used at the rate of 1 lb. of the powder form of arsenate of lead to 25 gallons of water, and should be thoroughly applied to both sides of the leaves. If the poison is applied as a dust hydrated lime should be employed as the carrier, using 1 lb. of the powder form of arsenate of lead to 4 or 5 lb. of the hydrated lime. The dust is best applied in the early morning, and for its application a hand dusting machine is thoroughly satisfactory. If a dusting machine is not available, the dust can be placed in a cheese cloth bag and then dusted on to the plants by shaking it over them.

Young plants may be protected from attack if the seedlings are covered with some form of netting or hessian which has been stretched over a suitable framework to prevent the beetles gaining access to the seedlings. Such a protective measure, however, is practicable only on a small scale. It will, nevertheless, tide the seedlings over a very dangerous period when the attack of a few beetles may very seriously injure or even kill the infested plants.

A further control measure that has been suggested by some investigators is to liberally dust the plants with wood ashes or lime. This procedure is said to act as a satisfactory repellent in outbreaks of ordinary severity.

Proposed Banana Board.

Notice has been issued of intention to constitute a Banana Board under the Primary Producers' Organisation and Marketing Acts, such Board to deal with all bananas produced in Queensland for sale, for a period of three years as from the date of the Order constituting the Board. The Board to deal with the commodity will consist of five elected representatives of growers and the Director of Marketing. For the purpose of election of growers' representatives, the State has been divided into five Districts as follows, each district to elect one representative:—

District No. 1—That part of the State north of and including St. Lawrence;

District No. 2—Areas served by the railway stations on the North Coast Line and Branches south of St. Lawrence to and including Theebine;

District No. 3—Areas served by railway stations on the North Coast Line and Branches south of Theebine to and including Monkland;

District No. 4—Areas served by the railway stations on the North Coast Line and Branches south of Monkland to and including Nambour;

District No. 5—Areas served by the railway stations on the North Coast Line and Branches, Main Line and Branches, South Coast Line, and Suburban Lines south of Nambour to the New South Wales border, including the Bay islands.

Upon the making of the proposed Order in Council, all the commodity (bananas) shall be divested from the growers and become vested in and be the property of the Board. Persons deemed to be growers and eligible to vote on any referendum or election in connection with the said Board prior to the making of the proposed Order shall be all persons who, at any time since the 1st January, 1928, have had for sale, bananas growing within any part of the State of Queensland; growers eligible to vote on any referendum or election held after the proposed Order has been made shall be all persons who, at any time during the twelve months preceding the date of such poll, harvested for sale bananas produced within any part of the State of Queensland.

Proposed Honey Board.

Notice has been issued under the Primary Producers' Organisation and Marketing Acts of intention to constitute a Honey Board to deal with honey and beeswax produced in Queensland by persons owning not less than five hives of bees in movable frames, such Board to be operative for a period of five years. The Board will consist of four representatives of growers and the Director of Marketing, and will be elected annually.

Persons eligible to vote on any referendum or election in connection with the proposed Board shall be persons who own, within a period of twelve months prior to the date of such election or referendum, at least five hives of bees in movable frames and market the honey and beeswax therefrom. Any petition for a poll to decide whether the proposed Board shall be constituted must be signed by forty growers as above and must reach the Minister before 13th February, 1929, and growers are invited to send their names and addresses at once to the Under Secretary, Department of Agriculture and Stock.

Egg Board.

An Order in Council has been approved, amending a previous Order in Council, constituting the Egg Board. The amending Order provides that the election of the Board shall be held in December or at such other time decided by the Minister. The original Order provided for the election to be held in December.

Primary Producers' Co-operative Association.

Regulation 37 under the Primary Producers' Co-operative Associations Acts has been amended to provide that auditors employed by an Association shall retire in each year and shall be eligible for re-election subject to the approval of the Auditor-General. An additional Regulation No. 59 provides that a firm of public accountants may be eligible to be appointed as auditors of an association in the firm name where all partners of the firm hold licenses under the Regulations, and may sign balance-sheets and reports in the firm name.

State Wheat Board Election.

The result of the election for a growers' representative to fill the vacancy caused by the resignation of Mr. W. J. T. Neale, Allora, for the No. 4 Wheat Board District, was:—

	Votes.
James Theodore Tod (Goomburra)	247
Heinrich Wilhelm Hinrichsen (Newholm, Clifton)	78
Charles George Shooter (Ellinthorp)	64
Edwin Sylvester Maher (Allora)	41
Philip Henry Imhoff (Upper Forest Springs, via Clifton) ..	40
Edward James Doyle (Allora)	11

Mr. Tod will accordingly fill the position lately held by Mr. Neale.

A Disturbed Balance.

The problem is to increase the production of primary products, and while in an ideal state we should have a town population fully employed in handling the primary produce and in supplying the many needs of the primary producers and of one another, our conditions are such that we have to import many articles that are manufactured in other countries. If we look squarely at the facts we have to interpret the presence of unemployed in our cities as evidence that the balance of town and country populations has been gravely disturbed in the wrong direction, temporarily at least. The academic economist has an easy way out of such a difficulty. All he has to do is to export—theoretically, of course—the surplus labour, and the balance is restored.—"Lyttleton Times" (N.Z.).

Mere Book Knowledge not Education.

"The aim of education," said Mr. Ramsay MacDonald in a recent speech, "is not fulfilled when you simply make pupils well-stocked reference files. Knowledge is not education. You can know as much as the wisest man in the world ever knew—unless his wisdom consisted of the affairs of the soul, I except that—but so far as his book knowledge is concerned, material knowledge and the knowledge of things, a man may know all that there is to be known and in the end be a consummate fool. The aim of education is not merely the acquiring of knowledge. It is far more akin to this—the capacity to use what you do know, and the man who can use a little of his knowledge is a far better-educated man than the man who knows a great deal and cannot use anything at all of it."

The City-ward Drift.

Growth of cities implies the development of that "home market" which, because it is close at hand and constant, is, as Adam Smith shows, the best of all markets in proportion to its size. And if the farmer has occasion to complain of the scarcity of agricultural labour, he should remember that this is partly due to the displacement of manual processes by machinery, which, even in the primary industries, has deprived large numbers of rural workers of employment and driven them to the towns for refuge. If we add to these the surplus immigrants who through a mistaken policy have been attracted to the country before any adequate provision has been made for them, and who have therefore never been able to "get on the land," we have gone some way towards explaining the "urban drift."—Auckland "Star" (N.Z.).

Production and Marketing.

In Great Britain, probably, we have tended in the past to think too much of production and not enough of marketing. Even now there are recurrent complaints that British manufacturers are inadequately informed on the special requirements of foreign buyers. Probably, too, we have given insufficient thought to the selection and training of salesmen for their particular work. The kind of training required by a British salesman, indeed, must be considered a training not so much in verbal dexterity as in the intelligent understanding of the goods in which he deals. A traveller in textile goods, for example, should be able to answer almost any technical question that can be put to him by a buyer, without need to refer to the factory for information. In all industries there is ample scope for technical training of this kind, and the higher the character of British goods the higher will be the character of the salesmanship required to do them justice.—"Yorkshire Post."

Are We Over Organised?

"We are overdone with reformers and organisers, and underdone with people of sufficient balance and judgment to realise the complexities of the problem and the difficulties inherent in it. We have suffered a great deal from the dangers of action founded on misunderstanding. There is never any doubt as to what is the right course for the individual. There is always grave doubt on the same question for groups of individuals, or for society as a whole. If that be true, wisdom would seem to lie in a lack of action except by individuals. That, I think, will be the tendency of the next generation or two. We have had far too much collective action and far too little encouragement for the individual. Such difficulties as beset us may be traced to these tendencies, and the hope of the future lies in a reversion of them."—Sir Ernest Benn, writing in "Producer and Consumer."

Brains in Industry.

"Just as the modern employer—who really to-day is not an individual or a board of directors but thousands of shareholders—has advanced in wisdom and vision beyond the old-time 'masters,' so the workers, with the great spread of elementary, secondary, and university education, are also more fitted to realise the dignity and the responsibilities of their place in industry as well as the vast potentialities of modern science and industry as a whole. A new craftsmanship of the brain has arisen to replace the old craftsmanship of the hand. These new craftsmen in whose care is placed the control and operation of great machines will not lightly throw their livelihood, their future, their firm, and their industry into the melting pot of strife and dissension. The clouds of industrial turmoil are clearing and the future is bright with the hopes of real progress towards a common understanding. That understanding will come from a quality which has never yet failed the British nation, and that is the intelligence and sound common sense of the vast majority of its people."—Lord Melchett in the "Manchester Evening News."

Service Before Self—and Pelf.

"No employee could do his best in a dehumanised concern. The worst wage-slave was not the poorest-paid worker, but the person, whether in a well-paid station or a lowly one, who worked merely for money. Ideal conditions could be arrived at only by great effort and by sympathetic understanding or understanding sympathy. They were conscious of their high calling, rendering a useful service by clothing and furnishing their fellows, and it followed that they could take no mean advantage, but should help to make business a great, thrilling experience, and not a treadmill with breaks for sleep. With right ideas, all would radiate happiness on their way to work, and enjoy an honourable weariness when they left it.—Mr. W. B. Veysey, chairman of John Dyer, Ltd., a successful British business enterprise.

The Kelpie—Its Origin.

What is the origin of the kelpe sheep dog? Is it an American product or is it related in some way to the Australian dingo?

Although recognised as a good sheep dog, very little appears to be known of the kelpie. One writer declares that it is a new type of dog that originated in America, but this writer failed to show its origin.

Writing on this subject, Mr. J. Hogan, of Bungonia (N.S.W.), states that the kelpie in reality is an Australian dog, the place of its origin being Queensland. In the first place it was a cross between the Queensland native dog and a smooth-haired terrier (probably a Border Collie). This was the starting point, but the first cross, naturally, was a mongrel and good for nothing. The next cross produced a different class of dog with the strain of the dingo, and gradually developed into the sheep dog. It bears a great resemblance to the dingo in its habits, but not in its body. Its colour generally is black with smooth hair, whereas the dingo is brown. The true kelpie is black and tan, with pricked ears. Like the dingo, it is very cunning, and although a good worker among sheep it loses its temper while at work and will snap or bite the sheep, and a muzzle has then to be used to break the dog of this habit. The kelpie requires careful watching, as in many instances it has been found that after two or three years' work among sheep it turns to killing—a vice inherited from the dingo. The kelpie has numerous friends among sheepmen, many of whom declare that it has not the vices that suggest its origin from the dingo.

Moving to Better Things.

The world has been moving to something better. It is always a better world than it was. Light comes into dark places, the crooked ways are made straight, the evil passes away. We must not be deceived because bad things are fighting hard for their life. The strongholds of evil do not fall like the walls of Jericho, at a sound of the trumpet or a mightly shout; they are brought down by some strange power that runs through all things, and is kept alive by all who believe. It is the faith that moves mountains which rules the world from age to age. Truth has been often on the scaffold. Wrong has been often on the throne. In the end the love of right and truth and justice and freedom and mercy has never been beaten in the world. The love of these things has broken the might of kings and shattered their empires to pieces.—Mr. Arthur Mee, the editor of the "Children's Newspaper," in its 500th number.

Go Back to Adam Smith.

"It is not fashionable for a man in trade to-day to inquire how he can increase his output. His thoughts are concentrated on the problem of limiting his market and maintaining his prices. Rubber, cotton, sugar, and many other commodities cry aloud of the folly of the method. It seems to me that here is work for our schools of economics. They should be able to make the people understand that they must stand in the market-place to be hired or in the queue to be rationed. We must have competition among producers or else we must go under as consumers; there is no middle course. A producer point of view leads us all the time to be tinkering with some detail or other—coal, ships, buttons, films, or French cherries; from the Prime Minister downwards we never seem to think of the nation as a whole, we are always favouring some one part at the expense of the rest. So I ask, would it not be wise for a time to forget about work and wages and prices and foreigners and empires, and all the rest of the popular political stock-in-trade, and go back to Adam Smith and his 'plentiful subsistence for the people'?"—Sir Ernest Benn, in the "Cambridge Review."

Swat that Fly.

With modern architecture, modern drainage, modern drying and heating and cooling and cleansing systems we can all be quite healthy if we do what prudence requires. But we cannot, unless by accident, remain healthy if we are careless and unclean. Flies, alone, as Dr. Lester reminded us recently, threaten us every hour of the day right through the summer, and although we all know this, or should, very few of us make a really sustained and intelligent effort to destroy flies whenever and wherever they appear. It is also the case that the methods by which rubbish is removed and destroyed in all New Zealand towns are "lamentably primitive and inefficient." Although we may have to put up with these methods a little longer, we should make it clear that we do not approve of them, and in the meantime bestir ourselves as individuals to nullify their evil effects.—Christchurch (N.Z.) "Press."

The Simple Things of Life

"My formula for a book to simplicity itself—an outdoor setting of land in which I have lived until, as Mary Austin expresses it, I know 'the procession of the year.' Then I people the location with the men and women who live there, and on my pages write down their story of joy and sorrow commingled as living among them I know it to be. This is the secret of any appeal that my work may make. And I want to say for such people as I put into books, that in the plain, old-fashioned country homes where I have lived, I have known such wealth of loving consideration, such fidelity between husband and wife, such obedience in children, such constancy to purpose, such whole-souled love for friends and neighbours, such absence of jealousy, pettiness and rivalry, as my city critics do not know is in existence. I never could write a historical novel, because I want my history embellished with anything on earth save fiction. I never could write of society, because I know just enough about it to know that the more I know, the less I wish to know. I have read a few 'problem' novels, and they appeal to me as a wandering over nasty, lawless subjects and situations of the most ancient type, under new names. There is nothing remaining for me but the woods, and the people I meet there. For every bad man and woman I ever have known I have met, lived with and intimately known an overwhelming number of strictly clean, decent people, and upon the lives of these I base what I write."—Gene Stratton Porter.

Courage in Excelsis.

"Visiting the wards of our hospital, for there perhaps as nowhere else we see courage in its purest form. The slings and arrows of what may appear to them an outrageous fortune are faced with a smile and with the head erect; there is no crouching as in despair, I leave those walls filled with a great wonder, humbled with a great humility, proud that in this world there are men and women and children with a courage edged so fine. We who practice the science and the art of medicine are sometimes said to work very close to those shadows which are cast upon the world by the turrets of oblivion. The shadows are suffering and disease, demands of Moloch which never seem to be satisfied, reminders perhaps that here we have no abiding city. And of those shadows surely the deepest is that of the disease or accident which, once encountered, either saps the vital spark from day to day or (and to some it seems the harder fate) leaves the poor sufferer living but crippled and, it may be, helpless. Some of these cases are among the real tragedies of human life, and so often they come to those least able, it would seem, to bear them."—Professor John Fraser, M.C., M.D.

Land as an Investment.

As an avenue for investment, land has fallen into neglect. The explanation notoriously consists in the inflation of values of land, and it may be doubted whether even yet, despite the efforts of the past few years to restore broad acres to their economic value, actual stability has been reached. The conditions, however, that affect the rural industries are distinctly promising. An exceptional production of dairy produce is anticipated this year; the wool sales so far in the present series yielded satisfactory prices and the extent of the clips that are to be offered is expected to be higher than last year; and the meat export season has been a favourable one. These circumstances should certainly increase the attractiveness of land as a security for investment, while the inevitable effect of the steady accumulation of money that has been going on must be an easing of the price of money.—"Otago (N.Z.) Daily Times."

Milk and Thunderstorms.

According to "Chem. Weekblad," a Dutch milk supplying company has made some investigations on the subject of the influence of thunderstorms on the development of acid in milk in a hope of being able to throw some light on superstitious tales of milk suddenly turning sour during electrical storms. It was investigated whether milk would turn sour more quickly if exposed to an electrified atmosphere than if kept out of it, and it was shown that neither the effect of alternate current, nor that of constant current of equal tension, as observed during thunderstorms, would have any influence on the quantity of acid in the milk, although exposed for fifteen hours. The opinion is, therefore, expressed, that electrical power, whether of atmospheric origin or otherwise, has no noticeable influence whatever on the rate at which the spontaneous acidification of milk takes place. It is thought that the real cause of milk turning sour during a thunderstorm is found in the higher atmospheric temperature generally prevailing previous to such storms.

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff of the Queensland Baby Clinics, dealing with the welfare and care of babies, has been planned in the hope of increasing their health and happiness and decreasing the number of avoidable cases of infant mortality.

ARTIFICIAL FEEDING.

To be successfully achieved, this is a matter which entails for the mother or nurse much work and never-failing attention to details.

With a healthy mother and child it should never be recommended, much less advocated as being superior to natural feeding. Indeed, the bottle-fed baby should be regarded as an unfortunate infant who, through very definite misfortune, has been deprived of that great birthright—his mother's milk. The death rate among artificially fed babies is, and always will be, higher than among those who are breast fed. Statistics tell us that of the babies who die in their first year many more are artificially fed than breast fed. This is a fact which should be known to, and well considered by, every woman who contemplates weaning a baby from his mother's milk and giving him a bottle.

Unfortunately, in some cases, owing to the death or prolonged illness of the mother, artificial feeding cannot be avoided. In such cases those in charge of the child should see to it that they obtain reliable information as regards his feeding. A brief illness—e.g., influenza—should never be regarded as an indication for weaning. Babies have frequently been fed by their mothers through attacks of influenza without any ill effects resulting. When the mother is too ill to nurse the child, the milk supply should be kept up by regularly and daily expressing the milk from the breasts.

Remember that the younger the child is when taken off the mother's milk and put on artificial food the greater are the risks attending the change. Up to weaning age—i.e., about nine months—before deciding to take a child off his mother's milk and bottle feed him, always make quite sure that the weaning is necessary. With a healthy mother and normal baby this is very rarely the case. Over 90 per cent. of women are able to feed their infants, if not wholly, at least partly.

Many mothers are inclined to think that their milk is not agreeing with baby, when what is really at fault is not their milk but their method of feeding. Sometimes baby gets wind or colic, or cries a good deal after he has been fed. Sometimes he sleeps badly at night. But all these conditions can be, and frequently are, due to faulty feeding—perhaps irregular feeding or overfeeding and not to any defect in the mother's milk. Sometimes the mother thinks that her milk looks too thin and watery, and that such a poor-looking fluid cannot contain enough nourishment for baby. But many analyses have proved that this watery-looking milk is just as rich and contains as much nourishment as the richer looking specimens. In some cases the mother is tempted to wean her baby because she sees glowing advertisements with pictures of large fat babies who have been fed on some artificial food, and she decides that she will give her baby the food which achieved such wonderful results. Babies fed on patent foods are frequently very fat, and very heavy, but there are no advantages, and several definite disadvantages in this excess of weight. The overweight baby is too heavy for his mother to carry about comfortably, especially in hot weather, consequently he may not be taken out for his necessary daily walk, as he could be if he weighed less. On account of his weight he does not learn to sit up, crawl, or walk as early as the child of normal weight, so is more helpless, requires more attention, and has to be carried about longer by his mother. Then, when he does walk, there is risk that his soft, growing bones may not be able to support his weight, and he may become bandy. So let every mother realise that, in spite of glowing advertisements, no artificial food is as good for her baby as his own mother's milk. Further, if baby has not been thriving on his natural food, he is likely to do much worse when given an artificial food.

No mother should wean her baby because she discovers that she has not quite enough food for him. She should give what there is and make up to the necessary amount with a little artificial food, given after—never before—the breast feed. In

such cases condensed milk must not be given to complete the feeding. It is very sweet, much sweeter than mother's milk; baby likes sweet things, and in a very short time he will show his preference by refusing to take his mother's milk. So the food which completes the feeding must be only slightly sweet. For such cases sugar of milk, which is only faintly sweet, should be used instead of cane sugar. Many people think that mother's milk and an artificial food cannot be given together, but this is a mistake. They can be given together; in fact, the mother's milk helps baby to digest the artificial food, and the child who is getting even a little of his mother's milk with the artificial food will thrive better than the one who is getting artificial food only.

IMPORTANT POINTS TO REMEMBER.

In cases where artificial food is absolutely unavoidable special attention must be paid to the following three points:—

Cleanliness; the food given; and the baby's ability to digest that special food. Notice that cleanliness is put first. A moment's thought will tell you that the best artificial food, given in an uncleanly way, could be a source of serious risk to the baby. This need for absolute cleanliness makes artificial feeding a matter entailing a great deal of work. The food and all utensils must be constantly guarded. If fresh milk is used the source of the supply must be inquired into to ensure that it is satisfactory. In the home it must be protected from dirt and contamination. Bottles, teats, and all other utensils used—and there are a good many—must receive care and attention before and after each feeding.

The upright feeding bottle is a good type to use; the rounded inner surface is easily cleaned, and there is no unnecessary valve. Also, its shape permits of the contents being easily warmed, when necessary, simply by standing it in a basin of hot water. Failing this, the boat-shaped bottle is best. The hole in the teat should be small enough to prevent the food from dripping into the child's mouth. It is of the right size when baby, sucking vigorously, takes his feed in about twenty minutes. A fact that mothers sometimes forget is that the hole in the teat quickly enlarges, and one that is the right size to-day may in two or three days be too large, and permit of baby getting his food much too quickly. So watch must be kept and the teat renewed when necessary.

The Food.—Milk is the only food for babies. When good fresh cow's milk is available, this is better than dried or preserved milk. The milk should be scalded as soon as possible. Raw milk is dangerous unless it is very fresh, very clean, and comes from cows free from tuberculosis. Boiled milk is easier to digest than raw milk, and so long as the baby is given a little orange juice daily after it is three months' old there is no disadvantage in using boiled milk. The simplest method is to put the milk in a small saucepan and take it off the stove as soon as it begins to boil. If pasteurised milk, delivered in sealed bottles, is being used it should not be boiled unless it has to be kept more than twelve hours. After that it should be boiled.

It is impossible to give a diet scale which will suit every baby, but it may be well to have some guide for feeding a suddenly weaned infant in an emergency, and until special instructions can be obtained from a doctor or welfare nurse. For a baby under six months commence with one part cow's milk to two parts water, and increase gradually until equal parts milk and water are being given. For a baby over six months commence with equal parts milk and water, and increase until two parts milk and one of water are being given. To each half-pint of the mixture add one level household tablespoonful of sugar. Dried milks can be useful when fresh milk is not obtainable, when the source of the milk supply is not satisfactory, in hot weather when milk will not keep, or when travelling. The full strength recommended on the tins should never be given at first, but about half this, and gradually increased. Healthy babies often thrive very well on these dried milks, but very young or delicate babies may be unable to digest them sufficiently.

Household tablespoons, which vary greatly in size, are not reliable for measuring baby's food; if one must be used, select a small one, but it is better to have accurate measures. The markings on the feeding bottles are usually correct.

The third point which must receive special attention is the child's ability to deal with any special food. It is a well-known fact that a food which will agree with one baby, and on which it will grow and thrive, may disagree with another, and even make it very ill. A baby's ability to tolerate a food can only be judged by giving it. This serves to emphasise the fact that babies should have, whenever possible, their mother's milk, which does agree with them. As regards regularity, time of feeding, &c., the artificially fed baby is treated in the same way as the naturally fed infant. If fed three-hourly, feed at 6 and 9 a.m., 12 midday and 3, 6 and 10 p.m. If four-hourly fed, and most normal babies are better fed so, feed at 6 and 10 a.m. and 2, 6, and 10 p.m. Give no night feeds from birth; make no exceptions to this rule.

THE CARE OF THE BABY.

Far more babies die during the hot months than during the cool season. Let no one blame the Queensland climate for this. Babies thrive and keep healthy in hot weather when proper care is taken. With a little knowledge of infant management all our unnecessary summer mortality might be prevented. During hot weather the baby should not be overclothed. He should have plenty of fresh air day and night, but should be shaded from the direct rays of the sun when he is out of doors, as he ought to be every day. During hot weather he is more thirsty and should be given a drink of water whenever he wants it. As he uses very little body fuel to keep up his body temperature, he needs rather less food, and is not so hungry as in cold weather. Any excess of food is more likely to upset him, and if the hot weather comes suddenly it is wise to cut down the quantity or strength of his food slightly, but he should have as much as he needs. Food that agreed with him before may upset him now, and advances in diet should be made cautiously. It is wise to wean babies in the cool months rather than in the hot months, though this is not always possible.

Every summer we have outbreaks of dysentery amongst our babies; no years are free from them. Dysentery is an entirely preventable disease. It is characterised by loose motions, containing blood and slime, often passed with much straining. There is rapid wasting and there may be high fever and great prostration. In many cases death ensues. It is sometimes called gastro-enteritis or summer diarrhœa, but its right name is dysentery. It is caused by dysentery bacilli, which are contained in the motions passed. Dysentery bacilli during epidemics are found also in the motions of many people who are only slightly indisposed or perhaps not ill at all. They may be conveyed by the mother's hands from the baby's napkins to the food of other children. From one house to another they are conveyed by flies which visit the closet-pans and infect the babies' food or the teats of their bottles or their dummies. Dysentery epidemics occur during the fly season.

The best preventive of dysentery is breast feeding. Flies cannot convey dysentery to the food of a breast-fed baby, but they are very fond of settling on the baby's dummy. The present fashion of using dummies and pinning them outside babies' frocks is a direct invitation to disease. It is exposing healthy babies to a serious risk of death. If a mother wishes to keep her baby safe from this dread disease she will put its dummy, if it has one, into the kitchen fire. If the baby is bottle-fed, she will take the utmost care to protect its food, its bottles, and teats, after scalding them, from flies. The lives of Queensland babies depend on the care taken by Queensland mothers. Are we to have any unnecessary babies' deaths this year? —Dr. A. Turner, Director of Infant Welfare.

RAISING SEEDLINGS.

The soil for the seed-bed or seed-box is prepared by mixing good garden loam with sand. Such a soil holds moisture well, allows the young plants every opportunity of pushing their way to the surface, and encourages a large root development. Too rich a soil in the seed-bed or seed-box has a tendency to produce long, spindly plants, while if the soil sets hard it is quite unsuitable for its purpose, and where the garden loam used in the mixture gives it such an inclination more sand should be used.

The seed-box need not be more than 4 to 6 inches deep. It is important that drainage be allowed for, and although the chances of successful seed-raising are very remote without good drainage, the provision is one which beginners often neglect to make. Unless the bottom boards of the box are divided by a well-defined space, it will be necessary either to replace them by narrower ones or to bore holes in them with an auger, so that the water may have an easy get-away. Small openings between the bottom boards are of little use, as the swelling of the timber after watering may make the box practically watertight. The bottom of the seed-box should be spread with a layer of pieces of broken pots or small stones. Over this should be placed (if available) a layer of leaf mould, and finally the sandy loam mixture in which the seed is to be sown. The surface should be pressed down with a piece of board before sowings are made.

To sow small seeds, whether in boxes or in the garden bed, make very shallow drills—just slight depressions—across the surface of the soil and sprinkle the seed evenly along them. For light seeding the seed should be picked up between the finger and thumb and dropped with a slow rubbing movement. After sowing, shake a little prepared soil over the surface and again press down lightly with a block of wood.

The watering of the seed-box or seed-bed must at all times be carried out with care, so that the flattening of the plants and the washing of the soil from their roots may be prevented. The boxes should be on a level, so that the effects of watering may be uniform. Unless the rose of the watering-can is an extremely fine one, it is preferable to immerse the boxes in water in a suitable receptacle in which the water is deep enough to percolate upwards to the surface of the soil, but not so deep that water will lie actually on the surface of the soil. If the original seeding has been too thick the young plants should be thinned out or pricked off into other boxes. Pricking out into a second set of boxes or a seed-bed has the effect of producing well-rooted, stocky plants which can be transplanted ultimately into the open with the least risk of failure. The young seedlings should not be pricked out until they have thrown out their third leaf.

THE BEAUTIES OF NATURE.

The man whose mind is so "artifical" that he can see no wonder and beauty in a growing shoot or budding flower, and who cannot appreciate the charm and inspiration of a blossoming peach tree, or imbibe peace and calm from a soft emerald lawn, or glorious scented roses, is to be pitied—and mistrusted, since he is probably lacking in other vital human qualities. We need not all be philosophers or poets; but the beauties of Nature should stir the emotions and make us, like Wordsworth, unconsciously richer in mind—

"I saw a crowd,
A host of golden daffodils. . . . .
I gazed—and gazed—but little thought
What wealth the show to me had brought:
For oft, when on my couch I lie
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure fills,
And dances with the daffodils."

Moreover, in the lives of even the happiest and most carefree among us there are moments of depression and disillusion, when we crave solitude, and when the comforting words of a well-meaning friend would only serve to irritate and accentuate our gloominess and "blue" feeling.

At such times there is nothing more soothing and consoling than a garden, wherein we may potter about and forget our woes—

"Flowers are so exquisite and so silent."

Gardening, therefore, as a hobby is unequalled for "taking us out of ourselves." A garden requires constant attention—watering, weeding, digging, and sowing—and leaves us little time for moroseness or self-pitying introspection. As the writer, Richard King, has so aptly said—

> "Gardening is the only hobby wherein a man is sufficient unto himself alone. Most other hobbies drag in at least one other person, either as critic, partner, or echo. But a man with a garden needs only faith and a seed catalogue."

The nature-lover is indeed never lonely. But to be a nature-lover does not imply knowing by rote the long scientific names of every weed and tree and plant or being able to judge with botanical accuracy the quantity of nitrogen which the roots of leguminous plants impart to the soil, and suchlike facts. It is well to know these, but not at the expense of simple delight and happiness. One need not become enthusiastic to the point of intellectual automatism! One can, without being able to name a single flower or bird or tree, be more sincerely a lover of Nature than the walking-guide-book-to-horticulture.

The true test is whether our spirit is gladdened by, and rejoices at, the simplicity of Nature. And what better way of appreciating this than by cultivating one's own garden patch? As someone has written, "Gardening must be God's hobby. It is the only human recreation with a 'soul' in it."—"Orchis" in the "South African Gardening and Country Life."

THE PLANTING AND CARE OF HEDGES.

When properly planted and kept in good order, a hedge is a great shelter and a lasting ornament to any place, and will add considerably to the value of a property.

It is advisable in this State to plant hedges on level ground, on account of the long spells of dry weather and the hot winds which prevail during the summer. Where the ground is swampy, however, it is necessary to form a bank or what is generally called a turf wall, two or three feet above the ground level, tapering on both sides, and about two feet broad on top. A line is run along the centre of the bank, and a little trench cut out, and the rooted cuttings are planted against the back of the trench, where the line is set. Where the turf has been removed to form the bank will now act as a drain.

The trench should be about 18 inches wide and a good spade deep. Some manure should be put in the bottom, and covered with a light layer of soil, and the plants placed up against the straight solid wall. The roots are covered with a little soil and well watered, and the trench filled up with the remainder of the soil. When this is done it is advisable to look along the row of plants to see if any are out of place. When the plants are made firm, cut them each to six or eight inches from the ground, and dig the ground for about three feet on each side of the hedge.

Hedges that are exposed to cattle must be fenced as soon as planted, either with a temporary stake and bush hedge, with hurdles, or with a light post and wire fence, for four or five years, till the hedge grows up, care being taken not to place the fence too close to the hedge. The hedge must also be duly weeded while young, especially during the first two years.

In order to preserve hedges in proper form, they must be clipped on the sides and tops at least once a year, and, if possible, oftener. The best time for the first cut is midsummer, with the second cut in April or May. The shoots should always be cut the same season while in leaf, and before they become hard. The work may thus be performed more expeditiously and with greater exactness, as the cutting should be as even as a wall on the sides, and the top as straight as a line. After the hedge is formed to its proper width, the growth should be cut as nearly as possible to that of the former cut, particularly on the sides. It should never be allowed to grow more than a foot or 18 inches wide, or too much on the top.

When the cutting cannot be carried out more than once in the year, the clipping should not be performed until the end of April or May in this State, for if cut sooner it will shoot again, and appear almost as rough all the winter as if it had not been touched.

High hedges are very troublesome and expensive to keep in proper order.

BUDDING FRUIT TREES—NO TIME LIKE THE PRESENT.

The present month is likely to be most suitable for budding both old trees and nursery stock. Old trees which were cut back at the end of the winter with a view to being worked in the summer should by this time have made quite sufficient mature young shoots to bud into. It is by far the best policy to work many more of these young shoots than will be required for the ultimate formation of the new tree, as there is likely to be some loss from heavy winds and other causes. Moreover, the leaf surface of the tree is very much reduced by the cutting back in the winter, and it is to the benefit of the tree to allow as much new foliage to grow as possible. The development of shoots from several points round thick stumps keeps the bark healthy all round, whereas if only a few shoots spring from one side the bark often dies away on the other side. The thinning out of superfluous shoots can be spread over several years.

There are three seasons—spring, summer, and autumn—when budding can be carried out, but autumn finds most favour with nurserymen for budding citrus trees. The operation is best carried out on fine days, avoiding wet days.

Insert the buds in the young stock about 4 to 6 inches above the ground, but when old trees are being worked over the buds may be inserted in the branches close to the trunk of the tree, and just where a limb is required. This will give the tree a good shape. It is generally found best to put the bud on the under side rather than on the top side of the limb, as, by inserting the bud on the top

of the limb in an old tree, the growth tends to be all inwards, thus unduly crowding the centre of the tree.

Medium-sized shoots afford the best buds, and well-developed buds are the best to use. The buds towards the top of a shoot are not usually well-developed, and those near the base are, as a rule, also small and poorly developed; and, while they might grow all right, the chances are they will not make such fruitful trees as those grown from buds which are large and well-matured, and which have clustered around them two or more fruit buds. This applies more particularly to peaches, apricots, nectarines, and plums.

As soon as the bud stick is cut from the tree, the leaves should be cut off just close to the bud, and the quicker the latter is inserted the better. This, together with tight wrapping, is the reason why men accustomed to the work have better success than amateurs, as they never mutilate a bud when cutting it, and from the time it is cut until it is inserted is only a matter of a few seconds. It is a good idea to carry the bud stick wrapped in wet sacking during hot weather to keep it from wilting and spoiling.

To make the cut in the stock, preparatory to inserting the bud, take a *sharp* budding knife and make a vertical cut from 1 to 1½ inches in length, then a horizontal cut directly across the top of the first cut, allowing the knife to press back, so that the bark is cut and slightly raised with the one operation. If the sap is flowing freely these two cuts extending through the bark are all that is required. As the bud will have to be slipped downwards into this cut, we must cut the bud from the bud stick by commencing the cut below the bud and finishing above it. This leaves the bottom portion of the bud in a very smooth condition, and allows it to keep its shape while being forced underneath the bark of the stock. It will be observed that the bark has not been loosened, except when making the horizontal cut, and then only sufficiently to allow the lower point of the bud to enter the bark, preparatory to being forced down with either knife or thumb.

To cut the bud from the bud stick, insert the knife half an inch below the bud, cutting through the bark into the wood, pass the knife under the bud and bring it out half an inch above it, thus severing the bud with a thin slice of wood adhering to it. The bud is now placed in the top of the cut made on the stock and forced down with the thumb or the blade of the budding knife. The bud is now ready to be tied, and if raffia is used it should be moistened before being used.

Care must be taken to see that the bud is tightly wrapped and securely fastened, for if the wrapping becomes loose the chances are the bud will not take. The bud will not be damaged even if it is completely covered by the wrapping, but if it is large it is as well to leave it slightly exposed. If there is any reason to expect rain about budding time, it is best to use a waxed cloth, and by starting the wrap from below the bud and finishing at the top it can be so wrapped that very little moisture will find its way underneath the waxed cloth.

CAPE GOOSEBERRIES.

When making the tomato bed and sowing seed, sow also the cape gooseberry. The cape gooseberry is a member of the same family group as the tomato, and the treatment that suits one suits the other. The plants like a fairly light soil, which has been well manured with either thoroughly rotted cow manure or well treated with meatworks manure and superphosphate. When the young plants are put in they should be well firmed into the ground, and given a good watering. It may be desirable, for a day or two, to give them a little shade. One who has had great success with the cape gooseberry recommends the following treatment:—"Although the cape gooseberry is a perennial, I find that it does best with us in Queensland when treated as an annual. It fruits very heavily in its first season, and I think far more heavily than in subsequent seasons. I like to sow the seed in large pots of fairly rich soil, though the soil must be light. The seed is quite big enough to let me put out each seed separately, and in that way I am able to ensure that the young plants are not crowded together. I sow the seed, water it, and then stretch a piece of white paper right over the pot. I put this pot out in the sun. It is not many days before the seeds show signs of breaking through the soil. I then remove the paper covering, and all I have to do is to see that the soil is kept moist. The plants grow very quickly, and as soon as they develop their second pair of leaves I put them out in the beds where they are to grow. I have a neighbour who, being an Englishman, and an old-time gardener, pricks his seedlings out. That is to say, after removing them from the seed pot he puts them into a small pot, and lets them develop in that pot before he transfers them, soil and all, into the bed. I think he probably has better results than I have, but then he has a lot more work."

Orchard Notes for March.

THE COASTAL DISTRICTS.

If the weather is favourable, all orchards, plantations, and vineyards should be cleaned up, and the ground brought into a good state of tilth so as to enable it to retain the necessary moisture for the proper development of trees or plants. As the wet season is frequently followed by dry autumn weather, this attention is important.

Banana plantations must be kept free from weeds, and suckering must be rigorously carried out, as there is no greater cause of injury to a banana plantation than neglect to cultivate. Good strong suckers will give good bunches of good fruit, whereas a lot of weedy overcrowded suckers will only give small bunches of undersized fruit that is hard to dispose of, even at a low price.

Cooler weather may tend to improve the carrying qualities of the fruit, but care must still be taken to see that it is not allowed to become over-developed before it is packed, otherwise it may arrive at its destination in an over-ripe and consequently unsaleable condition. The greatest care should be taken in grading and packing fruit. Only one size of fruit of even quality must be packed. Smaller or inferior fruit must never be packed with good large fruit, but must always be packed separately as required by regulation.

The marketing of the main crop of pineapples, both for canning and the fresh fruit trade, will be completed in the course of the month, and as soon as the fruit is disposed of plantations which are apt to become somewhat dirty during the gathering of the crop must be cleaned up. All weeds must be destroyed, and if blady grass has got hold anywhere it must be eradicated, even though a number of pineapple plants have to be sacrificed, for once a plantation becomes infested with this weed it takes possession and soon kills the crop. In addition to destroying all weed growth, the land should be well worked and brought into a state of thorough tilth.

In the Central and Northern districts, early varieties of the main crop of citrus fruits will ripen towards the end of the month. They will not be fully coloured, but they can be marketed as soon as they have developed sufficient sugar to be palatable; they should not be gathered whilst still sour and green. Citrus fruits of all kinds require the most careful handling, as a bruised fruit is a spoilt fruit, and is very liable to speck or rot. The fungus that causes specking cannot injure any fruit unless the skin is first injured. Fruit with perfect skin will eventually shrivel, but will not speck. Specking or blue mould can therefore be guarded against by the exercise of great care in handling and packing. At the same time, some fruit is always liable to become injured, either by mechanical means, such as thorn pricks, wind action, hail, punctures by sucking insects, fruit flies, the spotted peach moth, or gnawing insects injuring the skin. Any one of these injuries makes it easy for the spores of the fungus to enter the fruit and germinate. All such fruit must therefore be gathered and destroyed, and so minimise the risk of infection. When specked fruit is allowed to lie about in the orchard or to hang on the trees, or when it is left in the packing sheds, it is a constant source of danger, as millions of spores are produced by it. These spores are carried by the wind in every direction, and are ready to establish themselves whenever they come in contact with any fruit into which they can penetrate. Specking is accountable for a large percentage of loss frequently experienced in sending citrus fruits to the Southern States, especially early in the season, and as it can be largely prevented by the exercise of necessary care and attention, growers are urged not to neglect these important measures.

Fruit must be carefully graded for size and colour, and only one size of fruit of one quality should be packed in one case. The flat bushel-case (long packer) commonly used for citrus fruits does not lend itself to up-to-date methods of grading and packing, and we have yet to find a better case than the American orange case recommended by the writer when he came to this country from California in 1892, and which has again proved its superiority in the recent shipments of oranges from the Southern States to England. Failing this case, a bushel-case suggested by the New South Wales Department of Agriculture is, in the writer's opinion, the most suitable for citrus fruits, and were it adopted it would be a simple matter to standardise the grades of our citrus fruit, as has been done in respect to apples packed in the standard bushel-case used generally for apples throughout the Commonwealth. The inside measurements of the case suggested are 18 in. long, 11¾ in. wide, and 10½ in. deep. This case has a capacity of 2,200 cubic inches, but is not included in the schedule of the regulations under "*The Fruit Cases Acts*, 1912-1922." The

half-bushel case, No. 6 of the Schedule above referred to, is 10 in. by 11¾ in. by 5¼ in. inside measurements with a capacity of 1,100 cubic inches. The case should be suitable for oranges and the half-case for mandarins. No matter which case is used, the fruit must be sweated for seven days before it is sent to the Southern markets, in order to determine what fruit has been attacked by fruit fly, and also to enable bruised or injured fruit liable to speck to be removed prior to despatch.

Fruit fly must be systematically fought in all orchards, for if this important work is neglected there is always a very great risk of this pest causing serious loss to citrus growers.

The spotted peach moth frequently causes serious loss, especially in the case of navels. It can be treated in a similar manner to the codlin moth of pip fruit, by spraying with arsenate of lead, but an even better remedy is not to grow any corn or other crop that harbours this pest in or near the orchard. Large sucking-moths also damage the ripening fruit. They are easily attracted by very ripe bananas or by a water-melon cut in pieces, and can be caught or destroyed by a flare or torch when feeding on these trap fruits. If this method of destruction is followed up for a few nights, the moth will soon be thinned out.

Strawberry planting can be continued during the month, and the advice given in last month's notes still holds good. Remember that no crop gives a better return for extra care and attention in the preparation of the land and for generous manuring than the strawberry.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The advice given in these notes for the last few months regarding the handling, grading, and packing of fruit should still be carefully followed. The latter varieties of apples and other fruits are much better keepers than earlier-ripening sorts, and as they can be sent to comparatively distant markets, the necessity for very careful grading and packing is, if anything, greater than it is in the case of fruit sent to nearby markets for immediate consumption. Instruction in the most up-to-date methods of grading and packing fruit has been published by the Department, which advice and instruction should enable the growers in that district to market their produce in a much more attractive form.

The same care is necessary in the packing of grapes, and it is pleasing to note that some growers are packing their fruit very well. Those who are not so expert cannot do better than follow the methods of the most successful packers.

As soon as the crop of fruit has been disposed of, the orchard should be cleaned up, and the land worked. If this is done, many of the fruit-fly pupæ that are in the soil will be exposed to destruction in large numbers by birds, or by ants and other insects. If the ground is not worked and is covered with weed growth, there is little chance of the pupæ being destroyed.

Where citrus trees show signs of requiring water, they should be given an irrigation during the month, but if the fruit is well developed and approaching the ripening stage, it is not advisable to do more than keep the ground in a thorough state of tilth, unless the trees are suffering badly, as too much water is apt to produce a large, puffy fruit of poor quality and a bad shipper. A light irrigation is therefore all that is necessary in this case, especially if the orchard has been given the attention recommended in these notes from month to month.

Farm Notes for March.

Land on which it is intended to plant winter cereals should be in a forward stage of preparation. Sowings of lucerne may be made at the latter end of the month on land which is free from weed growth and has been previously well prepared.

The March-April planting season has much in its favour, not the least of which is that weeds will not make such vigorous growth during the succeeding few months, and, as a consequence, the young lucerne plants will have an excellent opportunity of becoming well established.

Potato crops should be showing above ground, and should be well cultivated to keep the surface soil in good condition; also to destroy any weed growth.

In districts where blight has previously existed, or where there is the slightest possible chance of its appearing, preventive methods should be adopted—i.e., spraying with "Burgundy mixture"—when the plants are a few inches high and have formed the leaves; to be followed by a second, and, if necessary, a third spraying before the flowering stage is reached.

Maize crops which have fully ripened should be picked as soon as possible and the ears stored in well-ventilated corn cribs, or barns. Selected grain which is intended for future seed supplies should be well fumigated for twenty-four hours and subsequently aerated and stored in airtight containers. Weevils are usually very prevalent in the field at this time of the year and do considerable damage to the grain when in the husk.

The following crops for pig feed may be sown:—Mangel, sugar beet, turnips and swedes, rape, field cabbage, and carrots. Owing to the small nature of the seeds, the land should be worked up to a fine tilth before planting, and should contain ample moisture in the surface soil to ensure a good germination. Particular attention should be paid to all weed growth during the early stages of growth of the young plants.

As regular supplies of succulent fodder are essentials of success in dairying operations, consideration should be given to a definite cropping system throughout the autumn and winter, and to the preparation and manuring of the land well in advance of the periods allotted for the successive sowings of seed.

The early planted cotton crops should be now ready for picking. This should not be done while there is any moisture on the bolls, either from showers or dew. Packed cotton showing any trace of dampness should be exposed to the sun for a few hours on tarpaulins, bags, or hessian sheets, before storage in bulk or bagging or baling for ginning. Sowings of prairie grass and *phalaris bulbosa* (Toowoomba canary grass) may be made this month. Both are excellent winter grasses. Prairie grass does particularly well on scrub soil.

Dairymen who have maize crops which were too far advanced to benefit by the recent rains, and which show no promise of returning satisfactory yields of grain, would be well advised to convert these into ensilage to be used for winter feed. This, especially when fed in conjunction with lucerne or cowpea, is a valuable fodder. Where crops of Soudan grass, sorghum, white panicum, Japanese millet, and liberty millet have reached a suitable stage for converting into ensilage, it will be found that this method of conserving them has much to recommend it. Stacking with a framework of poles, and well weighting the fodder, is necessary for best results. All stacks should be protected from rain by topping off with a good covering of bush hay built to a full eave and held in position by means of weighted wires.

Photo.: Jean Easton.]

Plate 64.

Shaded Silences.—A Peaceful Pool on Coochin Coochin.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	February. 1929.		March, 1929.		MOONRISE. Feb. 1929.	MOONRISE. Mar., 1929.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	5.26	6.46	5.46	6.24	11.14	9.45
2	5.26	6.45	5.47	6.23	11.47	10.20
3	5.27	6.45	5.48	6.22	0.0 a.m.	11.0
4	5.28	6.44	5.48	6 21	12.23	11 46
5	5.28	6.44	5.49	6.20	1.5	0.0 a.m.
6	5.29	6.43	5.49	6.19	1.53	12.34
7	5.30	6.42	5.50	6.17	2.43	1.28
8	5.31	6.42	5.50	6.16	3.37	2.22
9	5.31	6.41	5.51	6.15	4.32	3.29
10	5.32	6.40	5 51	6.14	5 31	4 20
11	5.33	6.40	5.52	6.13	6.32	5.20
12	5.34	6.39	5 52	6.12	7.31	6.20
13	5.34	6 38	5 53	6.11	8.29	7.19
14	5.35	6.37	5 54	6.10	9.27	8.20
15	5.36	6.37	5 55	6.9	10.27	9.23
16	5.36	6.36	5.55	6.7	11.30 p.m.	10.29
17	5.37	6.35	5 56	6.6	12.37	11.38 p.m.
18	5.38	6.34	5 57	6.5	1.44	12.42
19	5.38	6.34	5 57	6.4	2.49	1.44
20	5.39	6.33	5.58	6.3	3.52	2.44
21	5.40	6.32	5.58	6.2	4.51	3.38
22	5.40	6.31	5 59	6.0	5.43	4.25
23	5.41	6.30	5.59	5.59	6.26	5.4
24	5.42	6.29	6.0	5.58	7.2	5.36
25	5.42	6.28	6.0	5.57	7.37	6.13
26	5.43	6.27	6 1	5.56	8.9	6.39
27	5.44	6.26	6.1	5 55	8.40	7.10
28	5.44	6.25	6.2	5.53	9.11	7.42
29			6 2	5.52		8.16
30			6 3	5.51		8.54
31			6.3	5.50		9.38

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

2	Feb.	☽	Last Quarter	12 10 a.m.
10	,,	●	New Moon	3 55 a.m.
17	,,	☾	First Quarter	10 22 a.m.
24	,,	○	Full Moon	4 58 a.m.

Apogee, 4th February, at 6 30 p.m.
Perigee, 20th February, at 4 30 p.m.

As the Sun will be apparently amongst the stars of Capricornus from the 1st to the 17th that constellation will be on the western horizon at sunset, and the arch of zodiacal constellations, stretching from east to west at 8 p.m., will be :—Aquarius, Pisces, Aries, Taurus, Gemini and Cancer. At the end of the month, at 8 p.m., Aquarius will have disappeared in the west and Leo come into view on the eastern horizon.

The Southern Cross will rise early in the evening in the south-east with head bent slightly downwards; but at 10 p.m. on the 1st, and at 8 p.m. on the 28th, it will be in a horizontal position.

Mercury will be passing from the east to the west side of the Sun on the 7th, with its dark side to the earth; Later on in the month it will be visible in crescent-shape (in a telescope) before sunrise.

Venus will reach its greatest distance east of the Sun, 47 degrees, on the 7th, when it will set about 8·55 p.m. This brilliant planet and the crescent Moon will grace the western sky, about 9 degrees above the great Square of Pegasus, early in the evening on the 13th.

The occultation of Jupiter by the Moon on the 15th between 5 and 6 p.m., though occurring in daylight, will be an interesting event. The time of Jupiter's disappearance will depend upon the position of the observer, and will be earlier in the southern parts of Queensland than in the northern.

Mercury will set 29 minutes after the Sun on the 1st, with the Sun on the 7th and on the 14th at 5·38 p.m.

Venus will set at 9·6 p.m. on the 1st and at 8·45 p.m. on the 14th.

Mars will rise at 10·40 p.m. and set at 8·48 a.m. on the 1st. On the 14th it will rise at 10·53 p.m. and set at 9·3 a.m.

Jupiter will rise at 11·34 a.m. and set at 10·50 p.m. on the 1st. On the 14th it will rise at 10·49 a.m. and set at 10·3 p.m.

Saturn will rise at 2·4 a.m. and set at 3·46 p.m. on the 1st. On the 14th it will rise at 1·18 a.m. and set at 2·58 p.m.

3	Mar.	☽	Last Quarter	9 9 p.m.
11	,,	●	New Moon	6 36 p.m.
18	,,	☾	First Quarter	5 41 p.m.
25	,,	○	Full Moon	5 46 p.m.

Apogee, 4th March, at 2·54 p.m.
Perigee, 18th March, at 12.24 a.m.

Mercury will be at its greatest distance, 27 degrees west of the Sun, on the 4th. It will, therefore, be a morning star rising at 3·47 a.m.

The Moon will be passing Saturn about 8 a.m. on the 5th when Saturn will be about 8 diameters of the Moon below or northward of it. It will also pass Mercury at the same apparent distance on the 9th before midday.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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